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American Foundryman

A PUBLICATION PRESENTING ASSOCIATION AND CHAPTER ACTIVITIES

Make This War Year Our LAST War Year (See Page 20)

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January 1943

Men Make An Industry

THE history of the world, of our own country, of an industry or of a company is a record of men. When the men have had vision, courage, wisdom and good judgment, great progress has been made. We need not deal here with the records of selfish, domineering or slave driving men, for their achievements have ultimately been failures.

The Foundry Industry is a very old and important industry and shall probably continue to remain influential in the world's affairs. However, with the advent of new engineering materials and new methods of manufacture, the Foundry's position in industry can be maintained and improved only by having men controlling its destinies who have the attributes not only of business acumen but also of vision, skill and dauntlessness.

To supply the foundries of this country with young men who are evenutally to carry on the industry, is the consummation of the activities of the Committee on Cooperation with Engineering Schools. This requires not only that high caliber young men who wish to become foundrymen be recruited from colleges, but also that foundries be anxious to take on these young men.

The hiring of technically trained young men is merely the beginning. Progress of our industry is assured only after the employer has nurtured, trained and inspired these young men with the fascinations of this great industry. Once they are inspired we need no longer be concerned about their accomplishments.

Furthermore, the progressive destinies of our industry are assured only in the proportion that young men of high ability are ready and anxious to take over as the men of today assumed responsibility only a few years ago.

Frederick G. Sefing

F. G. SEFING, Chairman

A.F.A. Committee on Cooperation
with Engineering Schools

FREDERICK G. SEFING, research metallurgist, International Nickel Co., Inc., New York, N. Y., has been engaged in metallurgical research for many years and has contributed extensively to A.F.A. conventions, other technical society meetings and the trade press, articles on many important foundry subjects. In addition to acting as Chairman of the Committee on Cooperation with Engineering Schools, he is a member of the Gray Iron Division Advisory Committee and extremely active in the Association's technical and chapter activities, now serving as Chairman of the Metropolitan (New York) Chapter. In addition to metallurgical research work with a number of companies, he taught metallurgical subjects at Pennsylvania State College and Michigan State College for some 15 years, and has been a leader in the training of young men for the foundry and metal working industries.

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American Foundryman

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Entered as second class matter July 22, 1938, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

Fortuitous Circumstance

D. P. Forbes

President, American Foundrymen's Association.

THE late Andrew Carnegie habitually disputed friends who held that his success derived from a genius which marked him as a man apart. Whenever he was asked to what he ascribed his success, the canny Andrew replied with a merry twinkle, "to fortuitous circumstance."

HE believed, leastwise he said he did, that he owed his success to the happy circumstance of always being at the right place at the right time.

I feel certain that if, in years to come, my name is recalled by any within the metals casting industry, it will be for just such reasons of propinquity. In this signal year of 1942, I chance to be President of the American Foundrymen's Association. This is an experience which perennially occures to one or another of us, and from which regular accessions we have come to take a comforting sense of the rightness of things, even as we do from the advent each year of renascent spring.

THROUGH many administrations of the Association's valued affairs, there has run a thread which, by chance and good fortune, emerged during my administration as a garment to clothe a reality grown from a dream of long standing. I am referring to the tangible beginning made this year toward the development of a Foundation for financing much needed castings research and collateral activity. This plan provides a means by which the Association will be enabled, without a recurrence of fund-raising efforts, to finance a vastly expanded program along lines in which it has abundantly demonstrated its capacities.

IT was my pleasure on the 18th of December to entertain as my guests at dinner in Chicago, a group of some 30 leaders in all branches of our industry. Both as a foundryman and as President of the Foundrymen's Association, I asked these men to come and sit down with me because I wanted to be certain, just as our Board of Directors wanted to be certain, that we were on the right track, that we were causing to be started in behalf of our industry an institution for good which would possess in the minds of others, the values which we ourselves ascribed to it.

EXPRESSED at that dinner were disagreements, and there were introduced matters relating to the Foundation which will require expert planning if present divergencies are to be reconciled. All of these things occurred as one would imagine they might, when so many men representing so many points of view are asked to pass judgment on anything so far-reaching, so basic, and so comprehensive as our Foundation proposal. The experience was a pleasant one which all of us who were there will long remember. In a sense, it was democracy at its best, it was a group of men in the true tradition of American industrial greatness, sitting down together and saying, "This is the problem, how should it be met?"

FOR there is a very real problem which to neglect would mark us as derelict to our trust. Although the foundry industry is fifth in size in the United States, it is nowhere near that in point of the amount of attention it gives to study and research. This means that it is not spending enough to insure its own perpetuity in health and prosperity.

LONG before this meeting, a few of us had taken great pains to learn all we could about the problems and the responsibilities inherent in the task. And when we were all through with the fact-finding, these facts looked good to us. What's more, they evidently met with the approval also of a majority of my guests that Friday evening in Chicago. I say they met with approval because virtually all of the funds which will be required to establish the program of the Foundation, develop its administration, and conduct the campaign for an initial financing of $1,000,000, were pledged by those who attended.

YOU can well imagine why we who had been laboring on the plan were most heartened by this tangible expression on the part of our colleagues, this evidence of their faith in it and us.

A true beginning has been assured. We believe that the Foundation of the American Foundrymen's Association will emerge one day as a cherished monument to the vision and selflessness of the men whose generosity has made this beginning possible. We also believe that it will credit the memory of our generation of foundrymen whose too short chapter in a long romance of the molding of metals will have left this accomplishment, in addition to many other gifts, to tomorrow.

FOR this development in the Association's long and useful history, I deserve small kudos. I have helped, of course, as would anyone, and I will continue to help as will most of us. However, there is this from which I can take some purely private and special pleasure, that like Andrew Carnegie, with whom I touch at no other point, I am a creature of fortuitous circumstance.

Seekers After Truth—There has been made this year by the American Foundrymen's Association a tangible beginning toward development of a Foundation for financing a greatly expanded program in castings research and collateral activity.

Correlated Abstract of Literature on Flowability and Deformation of Sands

By P. E. Kyle and F. R. Evans,* Cambridge, Mass.

Although the property of flowability in molding sands has been recognized as an important influence on the ease with which a sand is rammed in the mold, no test has as yet been devised and recognized by the Executive Committee of the A.F.A. Foundry Sand Research Committee as a standard for measuring this property. Authors of this article are active in devising a test for measuring flowability of molding sands. In this article they review work done and discuss problems involved in an investigation of what the term "flowability" really means.

A—Introduction

THE Subcommittee on Flowability of Molding Sands has as its function the determination of a suitable test to measure flowability. Recently the subject has been discussed by numerous authors here and abroad, and it is the purpose of this abstract to review the work which has been done and to discuss the methods and results critically.

Such a discussion leads to a partial clarification of the concept of flowability and thus will enable future workers to confine their efforts to the most important phases of the problem. Since the property of deformation is somewhat related to flowability, the work in this field has also been reviewed.

B—Reviews of Flowability Literature

In the literature it seems that the subject of flowability first received attention in a special booklet (1)† by Whitehead Bros. Co. in which the "quality of flow or mobility" is discussed, particularly as it applies to machine molding.

The sand should flow into the deeper pockets and corners of a pattern and also be permeable enough to withstand the necessary amount of squeezing or jolting for a perfect draw. It is stated that castings which are machine jobs are made at the bench at a loss because of poor flowability. A practical test is suggested which consists of squeezing a mold with a difficult pattern which has deep pockets or right angles and then examining this mold to see how hard it is and how well the sand flowed into the recesses.

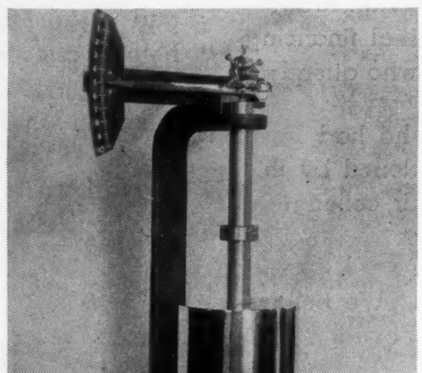


Fig. 1—Dietert flowability apparatus.

Dietert and Valtier (2) proposed a test which could be easily made on molding sand in order to determine its flowability. Flowability is defined as the property which enables sand to flow when a ramming energy is applied. The apparatus used is shown in Fig. 1 and it consists of the standard rammer and specimen tube with a dial gage attachment which permits the measurement of deformation of the sand during the ramming of the standard 2 in. diameter x 2 in. high specimen.

The sand is placed in the tube and given four blows of the rammer (14 lb.—2 in. drop). The dial gage is then set at 0 and the sand given another blow and the gage is then read.

It is assumed that if the sand does not flow as a result of this fifth blow it has already become properly rammed and thus a value of 100 per cent flowability is assigned. If the sand flows 0.100 in. (one revolution of the gage), the indication is that the sand was improperly rammed and this arbitrary value of sand movement was selected as the point of 0 per cent flowability.

Thus a sand which flows 0.027 in. due to the fifth blow would have a flowability of 73 per cent. By this test it was shown that flowability can be increased by a decrease in clay content, strength, grain size, permeability, sea coal, and moisture under temper, and by an increase in moisture above temper.

In Chadwick's paper (8) results are reported on flowability and deformation using the Dietert apparatus as shown in Figs. 1 and 9. The effect of clay content and moisture on flowability was also noted for several sands and in general, flowability increases with increases in moisture up to 6.4 per cent and with decreases in clay content for the samples tested.

Recently Wm. Buchanan (7) described a test for flowability using a rammed specimen of 1⅛ in. diameter x 2¼ in. high. The specimen was rammed to about the density of a standard A.F.A. compression specimen. Hardness readings were then taken on the top and bottom surfaces of the specimen and the flowability indicated as the ratio of the bottom hardness to the top hardness, expressed as a percentage.

The work done at M. I. T. (Massachusetts Institute of Technology) (5) and (9) involves a comparison of Dietert's sand movement test (2), a hardness differential test similar to Buchanan's, and one involving the use of hardness gradients in

*Assistant Professor and Instructor, respectively, Department of Mechanical Engineering, Massachusetts Inst. of Technology.

†Numbers in brackets refer to references listed in Bibliography at end of article.

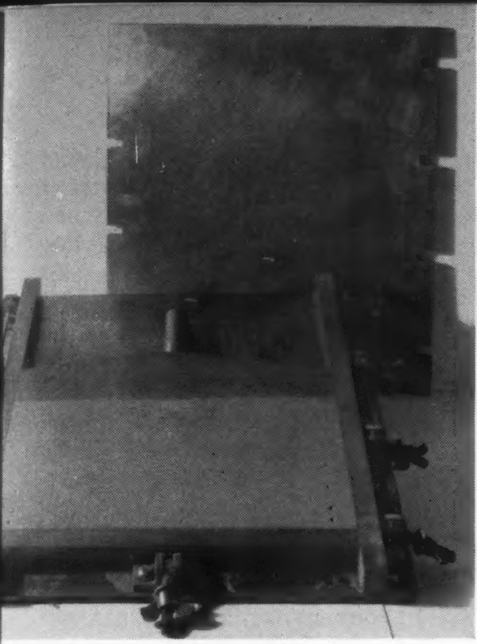


Fig. 2—Hardness gradient test mold.

a deep mold. The apparatus used for the gradient test is shown in Fig. 2.

The sand is placed in the mold from the side with the rammer in position and the side plate is clamped in position. The mold is rammed, jolted, or squeezed to a suitable hardness condition, the side plate removed, and hardness readings taken from top to bottom at close intervals.

The results are then plotted as in Fig. 3 and the flowability calculated as the ratio of the area (DBCOD) under the curve to the area ABCOA expressed as a percentage. The comparison of test methods for one sand is shown in Fig. 4 for various moisture contents. There seems to be some agreement between the hardness gradient and differential methods, but the sand movement gives the inverse relation.

C—Reviews of Deformation Articles

In one of the first articles (3) written on the subject of deformation of molding sand, Messrs. H. W. Dietert and R. A. Dietert attempted to correlate this property with other physical properties. To obtain the deformation data they used an autographic deformation tester (Fig. 5) attached to a Dietert standard compression strength machine.

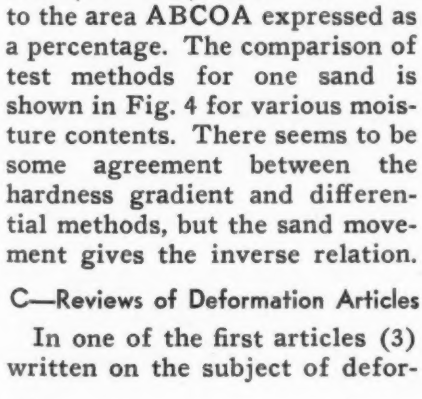


Fig. 3—Hardness gradient curve (squeeze pressure 100 lbs. per square inch).

Some typical curves obtained on this machine are shown in Fig. 6. The values which can be determined from these curves are listed as compression load, yield load, modulus of compression, sand resilience, deformation at rupture, and deformation at yield.

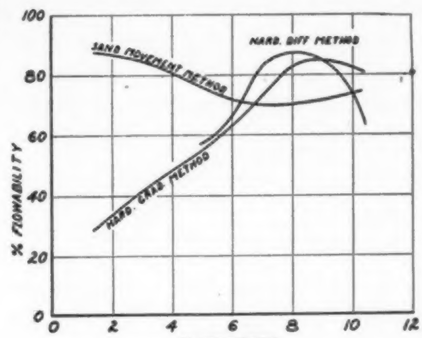


Fig. 4—Comparison of methods for measuring flowability.

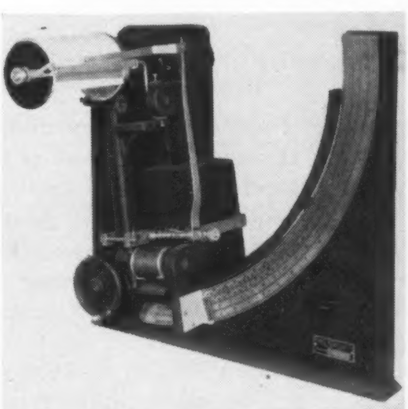


Fig. 5—Dietert autographic deformation apparatus.

Testing a natural Ohio sand, they found deformation increased with increasing moisture. A slight decrease in the deformation values with increase in grain size was noted for synthetic sands bonded with Illinois clay. Again with synthetic sands, Ohio silica plus Ohio clay bond, the deformation was seen to decrease as clay content increased up to 15 per cent; with continued larger amounts of clay, the deformation value increased.

Mold hardness affected deformation only slightly up to a hardness of 82; above that number, a rapid increase took place. About 6 per cent sea coal gave maximum deformation.

Further investigations (4) were carried on in 1939 by Messrs. H. W. Dietert and E. E. Woodliff for the purpose of setting up a working chart of strength, deformation and moisture to aid the foundryman in choosing the correct sand conditions. Sand toughness was introduced as a factor to combine strength and deformation to express the workable strength:

Sand Toughness = Strength $\times$ Deformation $\times$ 1000.

In regard to this term toughness they explained that: "Green strength is influenced by clay content, grain size, grain distribution, percentage of fines, amount of mixing;" while "Deformation is influenced by moisture content, type of clay, organic binders, tempering time."

More recently William Buchanan (7) has investigated deformation with a different testing technique. His apparatus (Fig. 7), which was hand operated, squeezes the specimen against a yoke.

The readings taken were not of deformation directly, but of the change in length of a spring previously calibrated with the aid of a 2 in. wood block as a standard. Deformation is then obtained by plotting the values read with a sand specimen and comparing them with those obtained with the wood block (Fig. 8).

With the aid of the new apparatus he accomplished the main part of his research, namely, to get values which could be dupli-

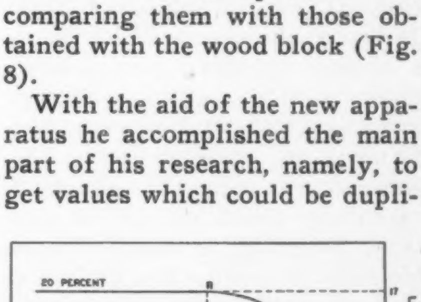


Fig. 6—Typical autographic stress-strain diagram (Dietert).

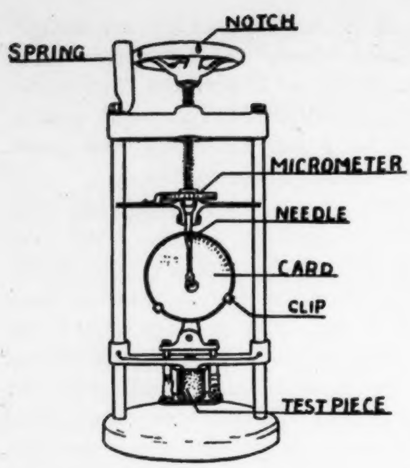


Fig. 7—Buchanan deformation apparatus.

cated very readily. However, he did conduct some work which demonstrated that deformation increased with mulling time up to three minutes, that it increased with moisture, and that it acted erratically to the addition of clay. Deformation seemed to be inversely related to flowability when both were tested by what he called the A.F.A. testing method (Dietert tests).

A still later article by R. Chadwick (8) is mainly a review of previous discussions of the relation of deformation to flowability. However, on test data which he obtained with Dietert apparatus this relation is rather complicated as he finds both deformation and flowability increase with moisture, but that deformation decreased while flowability increased with increasing clay content.

In some preliminary research done at M. I. T. (6) the deformation of naturally-bonded New Jersey sands was studied using a Dietert standard compression tester with a dial gage attachment (Fig. 9). Deformation was found to increase with the amount of moisture, reach a maximum about 6.5 to 7.0 per cent, drop off as 8.5 per cent moisture is approached, and then to increase rapidly with more moisture.

This same type of variation was noted with three sands of different grain size. Higher hardness values gave larger deformations but no direct relations were found. Also the larger grain sizes gave greater deformations than did the finer grained sands.

D—Discussion of Results

Concepts of Flowability.

In the book *"Testing and Grading of Foundry Sands and Clays,"* A. F. A. Transactions, (1938), p. 159, the following appears:

"Flow, Flowing Quality. The mobility of a foundry sand by virtue of which it fills recesses and moves against pattern surfaces not necessarily in the line of squeezing or ramming."

It seems that all work to date on this subject has been aiming at the above definition of flowing quality in sand. The term

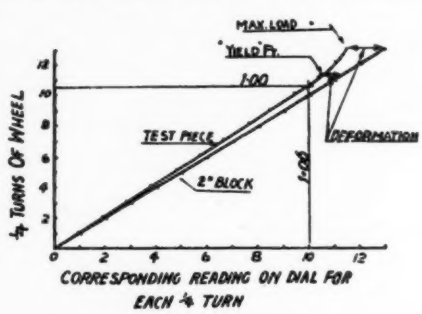


Fig. 8—Typical deformation curve (Buchanan).

mobility implies sand motion, and this is used in one test (2) as a criterion for flowability.

In this test, however, the sand is first rammed to a hardness somewhat higher than ordinary mold hardness before any sand movement is observed. As has been mentioned before, these results might be more indicative of the property of a sand to resist deformations during casting.

By visual examination it would be impossible to get any indication of the degree of flowability, since the sand might appear to have filled the recesses; but to be properly prepared the mold must have these recesses filled with sand which is in a suitable condition. Two of the most important conditions are suitable hardness and uniformity in mold surface.

In most cases the sand hardness has been used as a criterion to determine the suitability of ramming. This does not take care of the condition of non-uniformity of mold surface cited in (9) page 189, and (2) page 200. Here it seems that Dietert's test does distinguish between these two sands, giving a low value of flowability to the sand which shows voids after ramming to the same hardness as the sand showing no voids. Since this test is made on sands rammed to high hardness, further work will have to be done to verify the test as being indicative of flowability at the lower hardness levels.

Type of Specimen.

Specimens which have been used in flowability tests include (1) standard compression specimen 2 in. diameter x 2 in height, (2) special compression specimen $1\frac{1}{8}$ in. diameter x $2\frac{1}{4}$ in. height, (3) mold 1 in. x 12 in. with a depth of $12\frac{3}{4}$ in., and (4) a full size mold with an actual pattern.

In general, the experiences with a short speciment indicate that the sensitivity of the test is decreased. This is particularly true of the hardness differential method. It would perhaps be well to consider a test mold which approaches the conditions of depth of average molds and at the same time is convenient for test purposes.

Specimens which have been used in deformation tests included the standard compression specimen 2 in. diameter and 2 in. high, and a special compres-

Fig. 9—Dietert deformation apparatus.

sion specimen $1\frac{1}{8}$ in. diameter and $2\frac{1}{4}$ in. high. In either case the specimens are unsupported columns of sand and, while the deformation values obtained from them may be of use as a test to determine relative strengths and deformations of different sands, they do not give a true picture of the deformation within a mold where the sand is completely supported.

Preparation of Specimens.

Usual precautions have been observed in all testing which has been done. In actual practice it is not possible, of course, to use the same care in placing the sand in molds prior to ramming or squeezing as would be used in the case of the laboratory test mold.

In order to get a true comparison in the laboratory it will require that the sand be placed in the test mold according to a standard procedure to insure equal distribution. Similar experience was met in the design of the Doty bar test for green strength.

It will also be necessary to investigate the effect of irregularities in sand placement on the flowability of this sand in squeezing, jolting, or ramming. If it appears that the effect is marked, it may result in specifying more exact methods of distributing the sand in actual practice.

While a standard procedure is necessary in the preparation of deformation specimens, it would seem that some standards nearer to actual mold conditions than the 2 x 2 in. full hard rammed specimen could be chosen. It is quite possible that forming, i.e. ramming, squeezing and jolting by different methods, might give very different values of deformation for the same sand conditions. Standardization could be obtained by making all specimens to a set hardness regardless of the method by which the specimen is formed.

Measurements.

The instruments used in the flowability tests were rather simple and the results can be depended on as indicative of the conditions existing. Any failures to reproduce results were not due to the instruments but more likely to the preparation of the specimen.

In measuring deformation the values are so small that both the instruments and the operators are constant sources of error to such an extent that most investigators have found their values difficult to reproduce.

If deformation tests are run at speeds comparable to the recommended speeds for the compression test, there is considerable difficulty in obtaining accurate readings of load and deformation simultaneously. Autographic recorders with suitable accuracy are to be preferred, although the apparatus used by Buchanan, which required the operator to make only one reading, gave good results. Other errors may come from poor seating of the specimens on the heads of the machines and also from the fact that the specimens are not all exactly the same length.

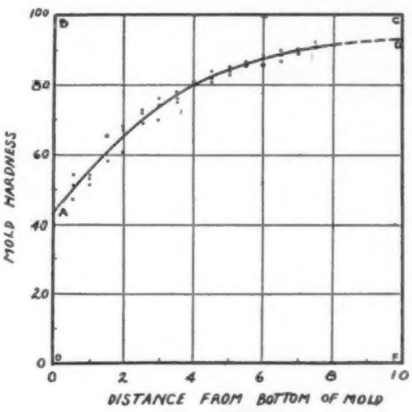


Fig. 10—Hardness gradient curve (squeeze pressure 100 lb. per square inch. 4.2 per cent moisture).

Relation Between Deformation and Flowability.

None of the investigators to date have set forth any definite relations between deformation and flowability but all of them feel that some relation exists. The two tests, however, should perhaps be applied to sands in two different conditions.

Deformation is a property of sands which prevents a mold from retaining its exact size as determined by the pattern dimensions and this property of sand should be determined from specimens in the same condition as a properly prepared mold. Flowability should be determined for the sand while it is being prepared to serve as a suitable mold.

The authors are of the opinion that very definite relations can be established between flowability as tested by the hardness gradient method, and deformation measured on an actual mold specimen.

Deformation and flowability are certainly interdependent within any one mold. For example, if a mold were made up of a poor flowing sand, the interior would not be packed as hard as it should be, with the result that the ferrostatic or other pressure built up by the incoming metal would cause excessive deformations. This condition would lead to the statement that a sand of good flowability would give low mold deformation values.

However, the deformation as obtained from the small unsupported specimens in the tests now used probably would not give such a relation to flowability as these specimens are of nearly uniform hardness throughout. In this connection some work is now being done at M.I.T. on the development of a mold deformation test from which mold stress-strain characteristics can be obtained.

E—Proposed Program of Research on Flowability

Preliminary work has been completed by the authors on a modified form of the hardness gradient test described in (5) and (9). In preparing the specimen the test mold is filled as uniformly as possible to a height of 10 in. and then a squeeze pressure applied. The side plate is then removed and hardness readings were taken at intervals of $\frac{1}{2}$ in. along the center line of the mold, and along two lines spaced 3 in. from this center line.

Assuming slight irregularities in the filling of the mold, it seems desirable to take several readings at the same height, so this method of reading and plot-

ting three sets of values is an attempt to represent average conditions in the mold.

The data is plotted as in Fig. 10 with the curve extrapolated as shown. In this plot a sand of 100 per cent flowability would be defined as one having developed a hardness of 100 throughout the full depth of 10 in. as soon as the load is applied. The per cent flowability calculation then follows as:

$$\text{Per cent flowability} = \frac{\text{Area OADEO}}{\text{Area OBCEO}} \times 100$$

The advantage of this method over that used in previous hard-

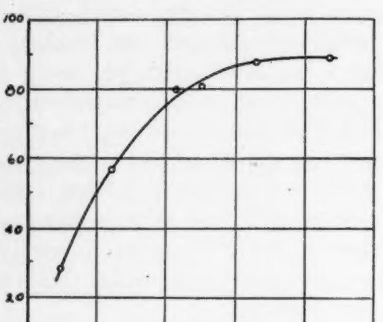


Fig. 11—Flowability (hardness gradient) vs. moisture.

ness gradient tests (5) and (9) is that it would take care of the case where two sands might have similar gradients at different hardness levels. This procedure can also be used for ramming and jolting.

Fig. 11 shows the effect of moisture on flowability for a natural bonded New Jersey sand. Further work will be done to study the effects of other variables such as grain size, clay content, clay type, etc.

An additional modification may be made in this test to study the flow of sands in a direction different from that of the line of application of the ramming or squeezing forces. This may be necessary in order to see if this property varies with relative direction of flow.

In shallow molds it is quite possible that sharp grained sand may flow better at right angles to the direction of the applied force due to a wedging action between grains. In a deep mold this wedging action would be most marked only at the top sections and in effect would decrease the flowability in the direction of the applied force. For a rounded grain this difference might not be as marked.

Regarding the voids noted by Dietert in sand samples rammed to high hardness, it would seem reasonable to assume that if there are visible voids in some regions there must be other regions throughout the sample where the hardness varies from the maximum to the hardness of a large void, which would be zero.

In our present method of plotting three points at each level it is possible to detect a certain scattering of points (Fig. 10). It may be possible to represent this scatter and the mean flowability value by means of a letter-number combination similar to that which is used in the grading of sands for their clay content and fineness.

F—Conclusions

There seems to be general agreement as to the nature of flowability and some disagreement as to whether all proposed tests measure this property. On the basis of data now available it seems desirable to relate flowability to the preparation of a mold and deformation to the ability of a mold to withstand the loads imposed on it by handling or by the weight of molten metal during pouring.

G—Bibliography

(1) *"Flow of Molding Sands"*; Pamphlet published by Whitehead Bros. Co., 1923.

(2) Dietert, H. W. and Valtier, F., *"Flowability of Molding Sands,"* Transactions A.F.A., Vol. 42, 1934, pp. 199-210.

(3) Dietert, H. W. and Dietert, R. A., *"Deformation and Resilience of Molding Sand,"* Transactions A.F.A., Vol. 44, 1936, pp. 139-157.

(4) Dietert, H. W. and Woodliff, E. E., *"Measure Deformation of Molding Sand," The Foundry*, Vol. 67, Sept. 1939, pp. 28-29, 70.

(5) Kyle, P. E., *"Flowability of Molding Sands,"* M.S. thesis, Massachusetts Institute of Technology, December 1939.

(6) Evans, F. R., *"Stress-Strain Relation of Foundry Sands,"* M.S. thesis, Massachusetts Institute of Technology, December 1939.

(7) Buchanan, Wm. Y., *"Sand Testing with Special Reference to Deformation," Foundry Trade Journal*, March 14, 1940, pp. 199-202.

(8) Chadwick, R., *"Deformation and Flowability Tests of Molding Sands," Foundry Trade Journal*, June 6, 1940, p. 416.

(9) Kyle, P. E., *"Flowability of Molding Sands,"* Transactions A.F.A., Vol. 48, 1940, pp. 175-192.

Third Report on High Temp. Sand Properties

A REPORT dealing with the effect of "ramming" on elevated temperature properties of steel foundry sands will soon be available to A.F.A. membership. Copies of the report also will be sent donors to the project which is conducted at Cornell University under the direction of the Sub-committee on Physical Properties of Steel Foundry Sands at Elevated Temperatures of the Foundry Sand Research Committee. The previous two reports have dealt with properties of typical sand mixtures, and specimen sizes.

Formerly under the direction at Cornell of the late Prof. A. C. Davis, the project is now being supervised by Prof. J. R. Moynihan in conjunction with Dr. H. Ries, Technical Director of the Foundry Sand Research Committee.

Concurrent with the announcement of the third report, it was stated that conversations were under way to interest the Naval Research Laboratory in conducting additional investigations of the high temperature properties of foundry sands. A further report on this development may be made in the February issue.

Urges Continuance of Apprentice Training

THE Federal Committee on Apprenticeship, at a meeting November 4 in Washington, D. C., recommended that industry continue apprentice programs on regular peacetime standards, but including provisions for training workers essential to war production. Specifically, it recommended as rapid advancement of apprentices as possible, and new programs designed to relieve the emergency training situation.

One perplexing problem today concerns sources from which new apprentices may be drawn for war production training, and the Committee recommended the tapping of groups least likely to be called to the armed services. Preferred

groups of this type include married men 20-30 years old with 1 or more children; men classified as ineligible for service for physical reasons; military personnel released from active service, and for some trades, women.

Since all apprenticeship is founded basically on the need for training skilled workers for the future, it was strongly recommended that apprentices be selected from youths 16 and 17 years old.

1943 Nominating Committee Holds Meeting January 10th

IN ACCORDANCE with Section I, Article IX of the By-Laws of your Association which read as follows: "There shall be created annually a Nominating Committee consisting of the last three living past Presidents of the Association and four other members, elected by the members of the Association at the annual meeting preceding the year of their service," and to Section II which provides, "The senior past President committee member shall be the Chairman," Past President Henry Washburn, Chairman of the 1943 Nominating Committee, has called a meeting of the committee for January 10, in Chicago.

The personnel of the 1943 Committee is as follows:

Past Presidents:

H. S. Washburn, Plainville Casting Co., Plainville, Conn.—*Chairman,* Senior Past President, representing gray iron;

L. N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala., representing malleable;

H. S. Simpson, National Engineering Co., Chicago, Ill., representing equipment and supplies.

Members Elected at the Annual Convention in Cleveland, April 22, 1942:

John Lowe, Battelle Memorial Institute, Columbus, Ohio, representing gray iron;

John W. Porter, American Steel Foundries, E. Chicago, Ind., representing steel;

H. M. St. John, Crane Co., Chicago, Ill., representing nonferrous;

R. J. Teetor, Cadillac Malleable Iron Co., Cadillac, Mich., representing malleable.

Chairman Washburn requested that, in submitting notice of and agenda for the meeting to committee members, there be included a copy of suggested procedure for conducting meetings of the Nominating Committee. Following are some of the points set forth in the procedure for the committee's consideration and guidance:

(a) On a Board of 17 members a fairly equal representation of the several divisions or branches of the casting industry, namely, iron, steel, malleable, aluminum and magnesium, brass and bronze, pattern making, equipment and supplies, should be maintained.

(b) Thought should also be given to maintaining proper geographical representation considered from the standpoint of industry strength and tonnage rather than geography alone.

(c) To maintain this industry and geographical representation, a study should be made of the representation on the Board as stated after those whose terms of office ending this year are retired.

Tables showing industry and district representation on the Board at present and as it will be when the 1943 class have been retired were also submitted to all Committee members.

Committee Procedure

The usual procedure in conducting a meeting of the Nominating Committee is for the chairman to invite all members to suggest the names of individuals that they desire to present for consideration as officers and directors. As names are submitted, they are entered on work sheets supplied to each committee member, one for each branch or division of membership with space provided for showing company name and geographical district each individual would be considered as representing.

This procedure gives an opportunity to acquaint each member with the names of potential candidates particularly from those districts which the committee have agreed are entitled to preferred consideration on the Board. It also acquaints the committee with the names of members who would qualify in maintaining a well balanced representation on the Board of Directors.

Not until every opportunity has been given for presenting names, are nominations called for, and the usual procedure has been to give every member an opportunity to nominate candidates before any nominations are seconded that all may have a complete picture of what the industry and geographical representation would be before final action is taken.

Members are invited to propose to any member of the committee or to the Secretary, names of members that they would like to have considered by the Committee, setting forth the individual's outstanding qualifications, such as: (a) Activities in Association work such as committee service, chapter work, presentation of papers and discussions; (b) Branch or branches of the industry he would represent; (c) Geographical district he would represent.

The committee will nominate candidates for the following offices:

President, to serve for one year;

Vice President, to serve for one year;

Five Directors, to serve three year terms each.

Foundry Idea Receives War Production Award

INCLUDED in the latest group of 58 workers to receive national recognition by the Board for Individual Awards of WPB for suggestions aiding war production, is one involving the foundry process. R. F. Schepis, plaster modeler at Republic Aviation Corp., Farmingdale, Long Island, N. Y., received "honor-

able mention" for developing a new mixture for making compound molds used in casting drop hammer dies. His idea greatly aided the production of complicated forms needed in airplane work.

WPB's Individual Awards Plan is the only governmental means of recognizing civilian workers who contribute to increased war production through their ideas. Such ideas, in the form of suggestions sent in from all parts of the country by all manner of industries, have been called "America's secret weapon."

Report on Cupola Research Program Shows Good Progress

DESPITE the press of war work in their plants, 80 members of the Cupola Research Committee are moving toward completion of the manual on cupola operation and its theories, one of the important projects in the Association's Cupola Research Program.

The first stage of the cupola research program, making a survey of existing literature, was completed last spring when Schuyler Herres, a research fellow of the committee at Battelle Memorial Institute, Columbus, Ohio, left to join the Army as a Lieutenant in ordnance at Watertown Arsenal. The survey was financed by the Cupola Research Committee and Battelle, each contributing $2,000 to cover the cost.

Abstracts of about 900 articles were prepared and sent to each member of the committee. The committee is divided into eight subcommittees, each preparing a section of the manual. Dr. E. E. Marbaker, Mellon Institute, Pittsburgh, is correlating and editing the manual material under the direction of a steering committee of which D. J. Reese, International Nickel Co., New York, has been appointed the chairman.

Chairman of the finance committee, Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., has announced the following additional subscribers to the project: American Brake Shoe & Foundry Co., N. Y.; M. A. Bell Co., St. Louis, Mo.; Berted Foundry Co., Columbiana, Ohio; Carondelet Foundry Co., St. Louis; Central Foundry Co., Holt, Ala.; East St. Louis Castings Co., East St. Louis, Ill.; Electric Wheel Co., Quincy, Ill.; The Foxboro Co., Foxboro, Mass.; Green Foundry Co., St. Louis, and Liberty Foundry Co., St. Louis.

Also, Mexico Refractories Co., Mexico, Mo.; Motor Castings Co., West Allis, Wis.; Robins Conveying Belt Co., Passaic, N. J.; Semi-Steel Castings Co., St. Louis; Tower Grove Foundry, Div. of LaClede Stoker Co., St. Louis; United States Pipe & Foundry Co., Burlington, N. J.; Universal Foundry Co., Oshkosh, Wis., and Worthington Pump & Machinery Corp., Harrison, N. J.

Book Review

Patternmaking and Foundry Work, by E. Molloy, 5¾ x 8¾, cloth cover, 112 pages, 132 illustrations, published by the Chemical Publishing Co., Inc., Brooklyn, N. Y. Price, $2.00.

This book is published to serve two purposes: (1) For the man engaged in the pattern shop or foundry, it purports to present a useful survey of established practice, and (2) to present to engineers a clear picture of the type of work which is involved in the production of castings. How these two purposes can be served in a book of this size is beyond the comprehension of the reviewer.

The four fields discussed in this book, namely, wood patternmaking, metal patternmaking, molding and casting, and die castings, each could easily be covered by a library. This book covers the subjects very sketchily, giving only a casual glance at some of the problems involved in the manufacture of a casting and mentioning others not at all.

Joint Committee Prepares Complete List of Definitions for Heat Treating Terms

FOR some time, definitions for the various heat treating terms have been required for industry. This fact was brought forth at the 1942 meeting of the American Society for Testing Materials.

As a result of this discussion, a joint committee composed of representatives of the Society of Automotive Engineers, American Society for Testing Materials, American Foundrymen's Association, and American Society for Metals was formed. The personnel of the committee is as follows:

Representing A.S.T.M.—

H. S. Rawdon, National Bureau of Standards, Washington, D. C., Chairman.
L. H. Fry, Edgewater Steel Co., Pittsburgh, Pa.
T. S. Fuller, General Electric Co., Schenectady, N. Y.

Representing S.A.E.—

J. R. Adams, Midvale Co., Philadelphia, Pa.
H. Bornstein, Deere & Co., Moline, Ill.
R. B. Schenck, Buick Motor Co., Flint, Mich.

Representing A.F.A.—

H. Bornstein, Deere & Co., Moline, Ill.
J. S. Vanick, International Nickel Co., New York, N. Y.

Representing A.S.M.—

R. H. Aborn, U. S. Steel Corp., Kearny, N. J.
V. O. Homerberg, Massachusetts Institute of Technology, Cambridge, Mass.
R. F. Mehl, Carnegie Institute of Technology, Schenley Park, Pittsburgh, Pa.

This committee held a meeting at the time of the A.S.M. convention following considerable correspondence and discussion among its members. As a result of this meeting, the following definitions have been compiled as a glossary of heat treating terms. *The Glossary of Heat Treating Terms is not intended to be a specifications, so should not be interpreted as such.* As this glossary is intended to be strictly a set of definitions, temperatures have purposely been eliminated from the definitions.

Age Hardening—(See *Aging*.)

Aging—A change in a metal by which its structure recovers from an unstable condition produced by quenching (quench aging) or by cold working (strain aging). The change in structure consists in precipitation, often submicroscopic, and is marked by a change in physical properties. Aging which takes place slowly at room temperature may be accelerated by a slight increase in temperature. (See also *Stress Relieving*.)

Annealing—A process involving heating and cooling applied usually to induce softening. The term is also used to cover treatments intended to:

(a) remove stresses;
(b) alter mechanical or physical properties;
(c) produce a definite microstructure;
(d) remove gases.

Certain specific heat treatments of iron-base alloys covered by the term *Annealing* are:

(a) Black Annealing,
(b) Blue Annealing,
(c) Box Annealing,
(d) Bright Annealing,
(e) Full Annealing,
(f) Graphitizing,
(g) Malleablizing,
(h) Process Annealing.

NOTE: Definitions of the above terms are given in their alphabetical positions in this Glossary.

Austempering—A trade name for a patented heat treating process consisting in quenching an iron-base alloy from a temperature above the transformation range in a medium having a suitably high rate of heat abstraction, and maintaining the alloy, until transformation is complete, at a temperature which is below that of pearlite formation and above that of martensite formation. The temperature for austenite transformation is chosen on the basis of the properties desired.

Black Annealing—A process of box annealing iron-base alloy sheets after hot rolling, shearing, and pickling.

NOTE: The process does not impart a black color to the product if properly done. The name originated in the appearance of the hot-rolled material before pickling and annealing.

Blue Annealing—A process of softening iron-base alloys in the form of hot-rolled sheet, in which the sheet is heated in the open furnace to a temperature within the transformation range and cooled in air; the formation of a bluish oxide on the surface is incidental.

Bluing—A treatment of the surface of iron-base alloys, usually in the form of sheet or strip, on which, by the action of air or steam at a suitable temperature, a thin blue oxide film is formed on the initially scale-free surface, as a means of improving appearance and resistance to corrosion.

NOTE: This term is also used to denote a heat treatment of springs after fabrication, to reduce the internal stress created by coiling and forming.

Box Annealing—A process of annealing which, to prevent oxidation, is carried out in a suitable closed metal container with or without packing material. The charge is usually heated slowly to a temperature below, but sometimes above or within, the transformation temperature range and cooled slowly. It is also called *Close Annealing* or *Pot Annealing*.

Bright Annealing—A process of annealing which is usually carried out in a controlled furnace atmosphere so that surface oxidation is reduced to a minimum and the surface remains relatively bright.

Brunorizing—The trade name for a special treatment applied to steel rails which, after cooling to a temperature below the transformation range, are reheated to a temperature slightly above that range, and then are allowed to cool in the air, the ends of the rails being partially quenched by jets of compressed air.

Burnt—A term applied to a metal permanently damaged by being heated to a temperature close to the melting point. The damage may involve melting of some constituent or penetration by, and reaction of the metal with, a gas such as oxygen, or by segregation of component elements of the metal.

Carbo-Nitriding—A process of case hardening an iron-base alloy by the simultaneous absorption of carbon and nitrogen by heating in a gaseous atmosphere of suitable composition, followed by either quenching or cooling slowly as required.

Carburizing—A process in which carbon is introduced into a solid iron-base alloy by heating above the transformation temperature range while in contact with a

carbonaceous material which may be a solid, liquid, or gas. Carburizing is frequently followed by quenching to produce a hardened case.

NOTE: The term *Carbonizing* is sometimes used erroneously in place of *Carburizing*.

Case—(1) The surface layer of an iron-base alloy which has been suitably altered in composition and can be made substantially harder than the interior or core by a process of case hardening. (2) The term *Case* is also used to designate the hardened surface layer of a piece of steel that is large enough to have a distinctly softer core or center.

Case Hardening—A process of surface hardening involving a change in the composition of the outer layer of an iron-base alloy followed by appropriate thermal treatment. Typical case hardening processes are *Carburizing, Cyaniding, Carbo-Nitriding*, and *Nitriding*.

Cementation—The process of introducing elements into the outer layer of metal objects by means of high temperature diffusion.

Controlled Cooling—A term used to describe a process by which a steel object is cooled from an elevated temperature, usually from the final hot forming operation, in a predetermined manner of cooling to avoid hardening, cracking, or internal damage.

Core—(1) The interior portion of an iron-base alloy which after case hardening is substantially softer than the surface layer or case. (2) The term *Core* is also used to designate the relatively soft central portion of certain hardened tool steels.

Critical Range or *Critical Temperature Range*—Synonymous with *Transformation Range*, which is preferred.

Cyaniding—A process of case hardening an iron-base alloy by the simultaneous absorption of carbon and nitrogen by heating in a cyanide salt. Cyaniding is usually followed by quenching to produce a hard case.

Decarburization—The loss of carbon from the surface of an iron-base alloy as the result of heating in a medium which reacts with the carbon.

Differential Heating—A heating process by which the temperature is made to vary throughout the object being heated so that on cooling different portions may have such different physical properties as may be desired.

Differential Quenching—A quenching process by which only certain desired portions of the object are quenched and hardened.

Drawing—The term drawing, or drawing the temper, is synonymous with *Tempering*, which is preferable.

Flame Annealing—A process in which the surface of an iron-base alloy is softened by localized heat applied by a high temperature flame.

Flame Hardening—A process of heating the surface layer of an iron-base alloy above the transformation temperature range by means of a high temperature flame, followed by quenching.

Full Annealing—A softening process in which an iron-base alloy is heated to a temperature above the transformation range and after being held for a proper time at this temperature is cooled slowly to a temperature below the transformation range. The objects are ordinarily allowed to cool slowly in the furnace, although they may be removed from the furnace and cooled in some medium which assures a slow rate of cooling.

Graphitizing—An annealing process applied to certain iron-base alloys, such as cast-iron or some steels with high carbon and silicon contents, by which the combined carbon is wholly or in part transformed to graphic or free carbon. *(See Temper Carbon.)*

Hardening—Any process of increasing the hardness of metal by suitable treatment, usually involving heating and cooling.

Heat Treatment—A combination of heating and cooling operations applied to a metal or alloy in the solid state to obtain desired conditions or properties. Heating for the sole purpose of hot working is excluded from the meaning of this definition.

Homogenizing—A high temperature heat treatment process intended to eliminate or decrease chemical segregation by diffusion.

Hot Quenching—A process of quenching iron-base alloys in a medium, the temperature of which is substantially higher than atmospheric temperature.

Induction Heating—A process of local heating by electrical induction.

Inverse Annealing—A heat treatment, analogous to *Precipitation Hardening*, applied to cast iron usually to increase its hardness and strength.

Malleablizing—A process of annealing white cast iron in which the combined carbon is wholly or in part transformed to graphitic or free carbon, and, in some cases, part of the carbon is removed completely. (See *Temper Carbon.*)

Nitriding—A process of case hardening in which an iron-base alloy of special composition is heated in an atmosphere of ammonia or in contact with nitrogenous material. Surface hardening is produced by the absorption of nitrogen without quenching.

Normalizing—A process in which an iron-base alloy is heated to a temperature above the transformation range and subsequently cooled in still air at room temperature.

Overheated—A metal is said to have been overheated if, after exposure to an unduly high temperature, it develops an undesirably coarse grain structure but is not permanently damaged. The structure damaged by *Overheating* can be corrected by suitable heat treatment or by mechanical work or by a combination of the two. In this respect it differs from a *Burnt* structure.

Patenting—A process of heat treatment applied to medium or high carbon steel in wire making prior to the wire drawing or between drafts. It consists in heating to a temperature above the transformation range, followed by cooling to a temperature below that range in air or in a bath of molten lead or salt maintained at a temperature appropriate to the carbon content of the steel and the properties required of the finished product.

Pot Quenching—A process of quenching carburized parts directly from the carburizing box or pot.

Precipitation Hardening—A process of hardening an alloy in which a constituent precipitates from a supersaturated solid solution. (See also *Aging.*)

Preheating—(1) A general term used to describe a heating applied preliminary to some further thermal or mechanical treatment. (2) A term specifically applied to tool steel to describe a process in which the steel is heated slowly and uniformly to a temperature below the hardening temperature and is then transferred to a furnace in which the temperature is substantially above the preheating temperature.

Process Annealing—A process commonly applied in the sheet and wire industries, in which an iron-base alloy is heated to a temperature close to, but below, the lower limit of the transformation range and subsequently cooled. This process is applied for the purpose of softening for further cold working.

Quenching—A process of rapid cooling from an elevated temperature, by contact with liquids, gases, or solids.

Sandberg Sorbitic Treatment—A treatment in which carbon steel objects are moderately hardened, either wholly or in part. It consists in cooling the parts to be hardened through the transformation range at a moderately rapid rate by the application of jets of air, steam, or atomized water and then allowing the residual heat in the object to effect a tempering operation.

Secondary Hardening—An increase in hardness following the normal softening that occurs during the tempering of certain alloy steels.

Soaking—Prolonged heating of a metal at a selected temperature.

Solution Heat Treatment—A treatment in which an alloy is heated to a suitable temperature and held at this temperature for a sufficient length of time to allow a desired constituent to enter into solid solution, followed by rapid cooling to hold the constituent in solution. The material is then in a supersaturated, unstable state and may subsequently exhibit *Age Hardening.*

Spheroidizing—Any process of heating and cooling steel that produces a rounded or globular form of carbide in the structure. Spheroidizing methods frequently used are:

1. Prolonged heating at a temperature just below the lower limit of the transformation temperature range with subsequent slow cooling.
2. Subjecting an object to a temperature which rises and falls alternately between a point within and a point just below the transformation range. This method gives good results with small high carbon steel objects.
3. Heating to a temperature above the transformation range and then, after holding a suitable time, cooling very slowly in the furnace (applicable to tool steel only).
4. Quenching in oil from the minimum temperature at which all carbide is dissolved, followed by reheating to a temperature slightly below the transformation range (applicable to tool steel containing a carbide network).

Stress Relieving—A process of reducing internal residual stresses in a metal object by heating the object to a suitable temperature and holding for a proper time at that temperature. This treatment may be applied to relieve stresses induced by casting, quenching, normalizing, machining, cold working, or welding. *Stress Relieving* is sometimes termed *Aging.*

Temper Carbon—The free or graphitic carbon which comes out of solution usually in the form of rounded nodules in the structure during *Graphitizing* or *Malleablizing.*

Tempering—A process of reheating hardened or normalized steel to a temperature below the transformation temperature range, followed by any desired rate of cooling.

Transformation Range—In ferrous alloys the transformation range on heating is the temperature interval within which austenite forms. The transformation range on cooling is the temperature interval in which austenite disappears. Distinction must be made between the two ranges. They may overlap but never coincide. The limiting temperatures of the ranges depend on the composition of the alloy and, particularly for the cooling, on the rate of change of temperature.

The committee suggests that members of the various cooperating groups study these definitions during the coming year and send any comments or suggestions to the secretary of the joint committee, J. Edward Donnellan, American Society for Metals, 7301 Euclid Avenue, Cleveland, Ohio. The present glossary of terms, as listed above, is intended by the committee to stand for one year, after which time another meeting of the committee will be held to consider comments and suggestions received.

A.S.T.M. Issues Complete List of Emergency Specifications

THE American Society for Testing Materials recently issued a complete list of Emergency Specifications and Emergency Alternate Provisions as of October 21, 1942. The list includes numerous specifications of interest to foundrymen. A list of such specifications is given below:

Emergency Specifications

ES-20—Malleable Iron Flange, Pipe Fittings and Valve Parts.

Emergency Alternate Provisions

Gray Iron

EA-A 190—Lightweight and Thin Sectioned Gray-Iron Castings (A190-40).

Steel

EA-A 27—Carbon-Steel Castings for Miscellaneous Industrial Uses (A-27-42).

EA-A 87—Carbon-Steel and Alloy-Steel Castings for Railroads (A87-42).

EA-A 148—Alloy-Steel Castings for Structural Purposes (A148-42).

EA-A 215 — Carbon-Steel Castings Suitable for Fusion Welding for Miscellaneous Industrial Uses (A215-41).

EA-A 216 — Carbon-Steel Castings Suitable for Fusion Welding for Service up to 850 F. (A216-42T).

EA-A 217—Alloy-Steel Castings Suitable for Fusion Welding for Service from 750 to 1100 F. (A217-42T).

Non-Ferrous Metals and Alloys

EA-B 30—Copper-Base Alloys in Ingot Form for Sand Castings (B30-42T).

EA-B 60 — Castings of the Alloy: Copper 88 per cent, Tin 8 per cent, Zinc 4 per cent (B60-41).

EA-B 62—Composition Brass or Ounce Metal Castings (B62-41).

EA-B 85—Aluminum-Base Alloy Die Castings (B85-42).

EA-B 86a—Zinc-Base Alloy Die Castings (B86-41T).

EA-B 143—Tin-Bronze and Leaded Tin-Bronze Sand Castings (B143-42T).

EA-B 144—High-Leaded Tin-Bronze Sand Castings (B144-42T).

EA-B 145—Leaded Red Brass and Leaded Semi Red Brass Sand Castings (B145-42T).

EA-B 146—Leaded Yellow Brass Sand Castings for General Purposes (B146-42T).

EA-B 148—Aluminum-Bronze Sand Castings (B148-42T).

WANTED
Action Foundry Pictures

Members of A.F.A.:

American Foundryman is *your* magazine. You can help in publishing it by supplying National Headquarters at 222 West Adams St., Chicago, with good action pictures of foundry operations. Many companies have large files of pictures showing men performing operations in the foundry. Send them to the National office and, if suitable, they will appear on the front page of American Foundryman where proper credit will be given those individuals or companies sending them in.

Help! Help!

How a Plant Can Win Army-Navy "E" Award

ASSOCIATING the men and women of industry with the fighting forces, the joint Army-Navy Production Award is a symbol by which the armed services confer highest praise for outstanding production of war materials. How the award . . . represented by the "E" flag for "Excellence" . . . can be won

by individual plants should be of interest to the foundry industry, many of whose members have won it already.

All plants engaged in war production and construction work are eligible, including governmental as well as private plants, plants partly engaged in war work, and sub-contractors as well as prime contractors.

Quantity and quality of production in light of available facilities are factors given greatest weight in selecting winners. Other factors considered include: Overcoming production obstacles, avoiding stoppages, maintenance of fair labor standards, training of additional labor forces, effective management, record on accidents, health, sanitation and plant protection, and utilization of sub-contracting facilities.

Any company that meets these qualifications should communicate with the Army or Navy Procurement Officer in closest touch with the firm, who passes the information on to the Navy Department or the Services of Supply of the War Department. Recommendations of these groups are then made to the Board for Production Awards.

"E" Award Not Permanent

No "E" award is permanent, records of each recipient being reviewed every 6 months by both the Army and Navy boards for the awards. If standards have not been upheld, the organization can no longer fly the pennant until the standards have again been met. Each renewal of the award gives the company the right to show a white star on its Army-Navy flag.

Solutions Are Wanted for Vital Technical Wartime Problems

THE Associated Defense Committee of Chicago Technical Societies, an organization composed of some 24 scientific and technical organizations in the Chicago area, has released a list of problems, the solutions of which would materially aid in winning the war.

The Chicago Chapter of A.F.A. is a member of the Associated Defense Committee. This committee cooperates with the local W.P.B., Army and Navy Ordnance groups, and the local Office of Civilian Defense. E. R. Young, Climax Molybdenum Co., Chicago, is Chicago Chapter committee chairman.

Listed below are some of the problems of a general nature for which solutions are being sought:

Aeronautics

A-1. A rate of climb indicator with a lag of not over approximately one-half second, preferably less. (Present climb indicators, including bellows with air bled through a capillary, have excessive lag and are rendered inaccurate by obstructions in the capillary. Approximate uniformity at all altitudes is essential. Sensitivity should be such as to permit readings of climbs of at least as gradual as 50 ft. per minute.)

A-4. Means to prevent collisions in mass bomber raids, or on congested airways.

A-10. Improved landing vision for rain and icing conditions.

A-12. Brakes for heavy, fast airplanes.

A-15. A good heater for the cabins of high flying airplanes.

A-18. Better airplane weapons against tanks.

Chemical and Metallurgical

A-21. Metal extraction methods enabling more practical use of low-grade ores abounding in the U. S.

Engines

A-24. An aircraft engine that will deliver greater horsepower per lb. of weight.

A-25. Valving devices for heat exchange and intercooling units of engines.

A-29. Means, preferably suitable for use in remote places, for keeping engines and their oil warm for immediate take-off during cold weather.

Guns, Sights, Etc.

A-31. Gun sight that will automatically compensate for lead. (The gun is swung to stay on the target; the amount of lead is in proportion to the rate of swinging. The lead to take is very difficult to figure out while firing, but the swinging of the gun could be made to do the job automatically.)

A-33. High-velocity gun as a tank buster.

A-36. Better systems of ammunition supply aloft.

War Machines

A-40. Means for increasing the effectiveness of tanks, including better vision.

Miscellaneous

A-41. Protective armored clothing light in weight.

A-46. Improved method of welding sheet aluminum alloy, and improved machinery for fabricating such alloys.

A-49. Portable electric generators.

A-53. Water supply and storage systems.

A-55. Road construction practices.

A-58. Aerial bomb protection methods for cities, buildings, ships.

Members of the Association are invited to try their hand at solving some of these problems. Any solutions or ideas on how these problems may be solved should be sent to Robert C. Brown, Jr., Chairman, Associated Defense Committee of Chicago Technical Societies, 205 West Wacker Drive, Chicago.

Once ideas or solutions are forwarded to Mr. Brown they become confidential material, and those members who suggest solutions should not expect to hear whether or not their ideas have been accepted.

Proper Credit Given

E. E. WOODLIFF, author of the article "Metal Penetration in the Mold" which appeared on pages 6 and 7 of the November, 1942, issue of *American Foundryman,* wishes to acknowledge that the illustrations used in this article were made available to him through the courtesy of the Hercules Experiment Station, Hercules Powder Co., Wilmington, Del. Credit for permission to use these illustrations was inadvertently omitted by the author in preparation of his manuscript.

Sustaining Members

INADVERTENTLY omitted from the list of Sustaining Members of the Association, as published in the December issue of *American Foundryman,* was the name of the Canadian Car & Foundry Co., Ltd., Montreal, Quebec, Canada. The Canadian firm's membership is held in the name of C. F. Pascoe, Representative.

W.P.B. Authorizes Study of Greater Use of Cast Iron at Higher Temperatures

By R. J. Allen,* Harrison, N. J.

Although it is known that certain types of cast iron are able to withstand higher temperatures than those to which the metal is at present restricted, little has been done about it. Due to the necessity of finding every possible substitution for critical materials, the use of cast iron at higher temperatures than previously allowed has become an essential factor in the war effort. As a result, the War Metallurgy Committee of W.P.B. has authorized an investigation of the application of cast iron at temperatures as high as 1000° F.

BACK in 1914, the A.S.M.E. Boiler Code Committee inserted a restrictive clause in the unfired pressure vessel section which limited the use of cast iron to temperatures of 450° F. and under. This restriction still stands despite the unquestioned improvements which have been made in the quality and physical characteristics of the gray and alloyed cast irons produced by the more progressive foundries. This limitation unfortunately has been accepted by many in industry as a top figure for all applications, and consequently the use of cast iron has been curtailed in many places where the service conditions would seem to justify its use.

H. J. French,† reviewing the paper by Bolton and Bornstein on the *"Effect of Elevated Temperatures on the Mechanical Properties of Gray and Malleable Iron,"* part of a symposium on the effect of temperatures on the properties of metals, sponscored by the joint ASME-ASTM Research Committee in 1931, wrote as follows:

> ". . . Although the use of gray iron alloys for pressure-containing parts has been limited to a maximum temperature of 450° F. by the A.S.M.E. boiler code, it is probable that this rating is unduly severe when applied to some of the better classes or grades of cast iron used today. In other fields gray iron castings frequently are used at temperatures up to 700 or 800° F., and where service is not severe have been used at even higher temperatures. Where service conditions indicate that growth is not likely to be serious, the better classes or grades of gray iron castings probably can be used at temperatures up to 800° F. Beyond this point it appears that the likelihood of graphitization will limit their use."

Opportunity Lost

This opportunity, in which the possibilities of cast iron were attractively publicized, unfortunately was not taken advantage of by those interested in promoting its use. Since then, despite the increased use of cast irons of suitable qualities in many applications outside the code requirements, at temperatures in excess of 450° F., comparatively little performance data has been made available to substantiate the claim for greater recognition. Hence the hurdle still stands.

However, the requirements of the war have prompted a renewed interest in the matter because of the possibility of a wider substitution of cast irons for more critical materials in those applications where temperature is the principal limitation. The American Foundrymen's Association, in a desire to accelerate this effort, has appointed a committee, the Committee on High Temperature Properties of Cast Iron, to investigate its present status in those applications involving temperatures above 450° F., with a view to determining whether or not the performance has been sufficiently impressive to warrant a review of present standards; and if so, what the new figure or figures might be.

WPB Agrees to Project

Because of its possible effect in relieving the admittedly critical situation in other divisions of the industry, the War Production Board and through it the War Metallurgy Committee, have become interested to the extent that the latter has agreed to sponsor a project designated, descriptively, as "A Study of the Possibilities of the Increased Utilization of Cast Iron in High Temperature Operations."

At an organization meeting in Washington called by Clyde Williams, Chairman of the War Metallurgy Committee, to discuss procedure, it was decided that the first step in the program was one of fact finding. To what extent is cast iron used at temperatures above 450° F.; what are the principal fields of application; what are the chemical and physical characteristics of the irons which have been most successful in these applications and, where failures have occurred, what have been the probable causes?

It was further decided that the most authentic information as to performance should come from the user rather than the producer, but both must be contacted. The producer will be asked to indicate for whom he has built such equipment, the type of iron used and the design details. The user will tell the actual conditions of operation and the performance obtained.

Fact Finding Study

With such data available, it should be possible to determine whether or not the evidence warrants a more aggressive sponsoring of the use of cast iron for specific applications at temperatures above 450° F. If the answer is yes, then the American Society for Testing Materials, in cooperation with the proper government agencies, may develop suitable standards covering its use. If the answer is no, it is logical to assume that the direc-

*Worthington Pump & Machinery Corp., and Chairman, Gray Iron Division Committee on High Temperature Properties of Cast Iron, and a Director of A.F.A.
†*Iron Age*, July 9, 1931.

tion for study most likely to produce the desired results will at least be indicated. The basis for a program of procedure, positive or negative, should be established.

T. E. Barlow of the Vanadium Corp. of America, and C. O. Burgess of Union Carbide & Carbon Research Laboratories, have volunteered their services to secure the desired information. During the next few weeks, they will separately contact key men in the major industries and visit as many representative installations as possible where cast iron is being used under the conditions being considered. They naturally will give the most attention to those applications which appear most likely in promoting the war effort.

It is possible that other engineering specialists may be called upon to contribute a limited amount of time to the investigation of failures, to establish their cause and to determine whether the material or the operating conditions, either normal or abnormal, were at fault. The data, as quickly as available, will be reviewed by the various groups involved and conclusions reached as promptly as practical.

Limits of Investigation

The investigation for the present will be limited to those applications involving temperatures between 450 and 1000° F. Later, consideration may be given to the field of 1200° F. and above.

Dr. A. E. Schuh, Director of Research, U. S. Pipe & Foundry Co., and Research Supervisor on Cast Iron for the War Metallurgy Committee, will supervise the work for the War Metallurgy Committee and serve as chairman of the project advisory committee. The latter consists of R. J. Allen; R. G. McElwee, Vanadium Corp. of America, Detroit; M. Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., and J. S. Vanick, International Nickel Co., New York—all members of the Committee on High Temperature Properties of Cast Iron.

Naturally, the group is anxious to secure all available data having to do with the use of cast iron within the temperature range stated, and it is hoped that those who are in a position to contribute will communicate with T. E. Barlow, Vanadium Corp. of America, 2440 Book Bldg., Detroit, Michigan. It is a war effort and the maximum in results must be obtained in the minimum of time.

Other members of the A.F.A. high-temperature cast iron committee are: John W. Bolton, The Lunkenheimer Co., Cincinnati; J. J. Curran, Walworth Co., Greensburg, Pa.; A. J. Edgar, Gray Iron Founders Society, Washington, D. C.; M. V. Healey, General Electric Co., Schenectady, N. Y.; J. J. Kanter, Crane Co., Chicago; John Lowe, Battelle Memorial Institute, Columbus, Ohio; W. E. Mahin, Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., and G. A. Timmons, Climax Molybdenum Co., Detroit.

Apprentice Contests Announced for 1943

THE Apprentice Molding and Patternmaking Contests, which have been sponsored annually by the A.F.A. Apprentice Training Committee, again will be held in 1943, with the winners of the local competitions submitted for the National Contest at the Association's Second War Production Congress, at St. Louis, April 28, 29 and 30.

The A.F.A. Contest Committee is composed of the following:

Chairman, C. W. Wade, Apprentice Supervisor, Caterpillar Tractor Co., Peoria, Ill.; George A. Zabel, Training Supervisor, Universal Foundry Co., Oshkosh, Wis.; Frank C. Cech, Pattern Instructor, Cleveland Trade School, Cleveland; Harry A. Charlson, Foundry Supt., American Steel Foundries, East Chicago, Ind.; J. Morgan Johnson, Tri-City Manufacturers Association, Moline, Ill.; E. P. Meyers, Chain Belt Co., Milwaukee, Wis.; Jas. G. Goldie, Foundry Instructor, Cleveland Trade School, Cleveland.

The committee has developed contest regulations for both the local or district competitions and the national contest, and supplies patterns for the molding apprentices and blueprints for the pattern apprentices. The local contests may be sponsored by either individual foundries or pattern shops or by groups such as the A.F.A. Chapters.

Four groups of competitions have been approved for 1943:

Gray Iron Molding.
Steel Molding.
Non-Ferrous Molding.
Pattern Making.

National Contest prizes for 1st, 2nd and 3rd place in each of the groups will be awarded at St. Louis, with the prizes in each competition being $40, $20 and $10, respectively. Prize money is supplied by the Board of Awards of the Association.

Any foundry or pattern shop manager wishing to enter the apprentice contests may receive copies of the regulations and the blueprints or patterns by writing to the Secretary, Apprentice Contest, American Foundrymen's Association, 222 W. Adams Street, Chicago.

These competitions, first started in 1924, have attracted a great deal of interest, with a large number of entries each year. At the 1942 Cleveland Convention over eighty foundries and pattern shops had apprentices competing.

Naval Procurement Office Has Openings

THE Naval Office of Procurement has announced, through its Dr. J. L. Burns, member of the advisory committee of the Procurement Group, that special billets are now open for candidates with outstanding production experience. Application blanks for consideration now are available and may be obtained by writing to Dr. J. L. Burns, Booz Allen & Hamilton, 135 S. La-Salle St., Chicago, Ill.

Dr. O. A. Nelson, formerly research chemist, U. S. Department of Agriculture, has been appointed to the technical staff of the Battelle Memorial Institute, Columbus, Ohio.

Some Comments from Member Readers

American Foundrymen's Assn.
Dear Mr. Secretary:

The benefits derived by our organization from the 1942 molding contest have been most encouraging in several respects. Apprentices, foremen and the Training Department heartily agree upon this fact.

Our boys exhibited especially keen interest in various methods of gating and placing of risers and their relative merits. Each diagnosed his casting, pointing out how it could have been improved.

I am definitely of the opinion that projects of this sort serve both as an indication of, and an aid to, progress as well as bring home to the apprentices the necessity of careful and thoughtful molding.

Very truly yours,
HENRY H. REDDER,
Apprentice Supervisor.
McCormick Works,
International Harvester Co.,
Chicago, Ill.

Hq. V Corps (Reinf)
APO 305, New York
20 October, 1942

American Foundrymen's Assn.
Chicago, Illinois.
Gentlemen:

Thank you so very much for your kind letter of September 29. I sincerely appreciate your kindness in continuing to carry me as a member of the American Foundrymen's Association.

I am receiving the monthly magazine regularly and thereby am enabled to keep up in a fashion with the activities of the Association. It is a real pleasure for those of us over here to get the news of the efforts of our colleagues at home.

Keep them flying.

SAM F. TEAGUE, JR.
1st Lieut., A.G.D.

EDITOR'S NOTE: The American Foundryman and A.F.A. literature are being sent wherever possible to members of the Association known to be in the Armed Services. In addition, their memberships are being carried by the A.F.A. for duration.

Florence, Colo.
November 23, 1942.
American Foundrymen's Assn.
Chicago, Illinois.
Gentlemen:

Your letter received in regard to membership in your Association. About 2 years ago I started a small iron and brass foundry, the Florence Mfg. Co. But as the war called more men, it finally was left all to me, and since I am old and was in a railroad wreck 10 years ago, which is telling on me now, I have quit business. But it is a difficult job for me to stop.

During the last War I was a member of A.F.A. and can say it was useful then and no operating foundry now can afford not to join, as we all are in a jam, and it is not apple jam.

Yours for Victory,
WILLIAM GILBERT
(Over 40 years experience)

Washington, D. C.,
October 9, 1942.
American Foundrymen's Assn.
Chicago, Illinois:
Gentlemen:

We sincerely appreciate your very fine effort in co-operating with us and it is our thought that the articles you have published in your "American Foundryman" will intensify Fire Prevention Week and aid in the ultimate purpose that it serves . . . that of winning the war. It is our hope this campaign will be continued after Fire Prevention Week for the balance of the war.

H. E. HILTON,
Chamber of Commerce of the United States.

The University of Rochester is reported to have installed a giant 1,000,000-volt industrial x-ray machine, capable of testing thick metal sections in a matter of minutes. Described as "one of the most powerful in the world," the machine was made possible by the cooperation of eight industrial firms in the region who will share its facilities. The apparatus is housed in a "completely shock proof" room of thick concrete walls.

New Members

(November 16 to December 15, 1942)

Conversions:
Company from Personal—
Frontier Bronze Corp., Niagara Falls, N. Y. (E. H. Holzworth, Pres.)

Birmingham District Chapter

Archie H. Jones, Pattern Maker, Goslin Birmingham Co., Birmingham
C. L. Snider, Fdry. Foreman, Stockham Pipe Fittings Co., Birmingham
W. J. Vinson, Jr., Cupola Foreman, Stockham Pipe Fittings Co., Birmingham
John Word, Foreman, Stockham Pipe Fittings Co., Birmingham

Central New York Chapter

Milton D. Emery, Fdry. Supt., United States Radiator Corp., Geneva, N. Y.
Walton E. Jones, Chemist, Elmira Foundry Co., Elmira, N. Y.

Chesapeake Chapter

E. R. Cone, American Brake Shoe & Foundry Co., Baltimore, Md.
Clarence W. Fabel, Assoc. Materials Engr., Washington Navy Yard, Washington, D. C.

Chicago Chapter

William E. Adams, Supt., Chicago Steel Foundry Co., Chicago
R. J. Franklin, Chicago Hardware Foundry Co., North Chicago, Ill.
Henry Gierahn, American Manganese Steel Division, Chicago Heights, Ill.
T. F. Lewis, Supt., American Brake Shoe & Foundry Co., Melrose Park, Ill.
***Miehle Printing Press & Mfg. Co., Chicago (Roy M. Kinder, Supv. of Fdries.)**
***North Shore Foundry Co., Waukegan, Ill. (B. Rause, Sec'y-Treas.)**
Joseph Tarre, Ceramist, Continental Roll & Steel Foundry Co., East Chicago, Ind.
C. P. Wright, Vice-Pres., American Brake Shoe & Foundry Co., Chicago

Cincinnati District Chapter

Marion L. Morris, Wright Aeronautical Corp., Lockland, Ohio
Ollie M. Rayburn, Leadman, Wright Aeronautical Corp., Lockland
Edward R. Schulte, Leadman-Core Room, Wright Aeronautical Corp., Lockland
William R. Siekman, Leadman, Wright Aeronautical Corp., Lockland
Huey Summers, Foreman, Wright Aeronautical Corp., Lockland

Detroit Chapter

Airplane School Library, Ford Motor Co., Willow Run, Mich.
Fred T. Holland, Owner, American Foundry & Pattern Co., Pontiac, Mich.
William P. Myers, Fdry. Foreman, Gorham Tool Co., Detroit
Frank Ruszczynski, Foreman, Chrysler Corp., Dodge Main Div., Detroit
***Wayne Foundry Co., Detroit (Charles D. Todd, Jr., Partner)**
***Wolverine Foundry Supply Co., Detroit (C. D. Yahne, Pres.)**

Eastern Canada and Newfoundland Chapter

Charles F. Armstrong, Robt. Mitchell Co., Ltd., Montreal, Que.
***Beach Foundry Ltd., Ottawa, Ont. (B. C. Beach, Pres.)**
Jos. Bourbonnais, Molder, Robt. Mitchell Co. Ltd., Montreal
M. Bussiere, Robt. Mitchell Co. Ltd., Montreal
Roger Cayer, Robt. Mitchell Co. Ltd., Montreal
Moe Champagne, Fdy. Foreman, Sorel Steel Foundries Ltd., Sorel, Que.
George Davison, Fdy. Foreman, Beach Foundry, Ltd., Ottawa
***Findlays Ltd., Carleton Place, Ont. (Arnold Weedmark, Fdy. Foreman)**
Gerard Gauvreau, Robt. Mitchell Co. Ltd., Montreal
Malcolm J. Hart, Salesman, A. C. Leslie & Co. Ltd., Montreal
***La Salle Coke Co., Montreal (M. A. Hughes, Industrial Salesman)**
Rene Lavoie, Fdy. Foreman, W. R. Cuthbert & Co., Montreal
R. Lefebvre, Core-maker, Robt. Mitchell Co. Ltd., Montreal
H. Lemay, Core-maker, Robt. Mitchell Co. Ltd., Montreal
***A. C. Leslie & Co., Ltd., Montreal (Edmund J. Cooney, Mgr. Fdry. Dept.)**
J. W. Miller, Mgr., Miller's Brass Foundry, Three Rivers, Que.
L. Morel, Pattern-maker, Robt. Mitchell Co. Ltd., Montreal
R. Pelletier, Molder, Robt. Mitchell Co. Ltd., Montreal
V. Raquepas, Robt. Mitchell Co. Ltd., Montreal
A. St. Antoine, Patternmaker, Robt. Mitchell Co. Ltd., Montreal
L. Savard, Robt. T. Mitchell Co. Ltd., Montreal
Irving C. Sheppard, Plt. Supt., Beach Foundry Ltd., Ottawa
Arthur R. Smith, Salesman, A. C. Leslie & Co., Ltd., Montreal

Metropolitan Chapter

***Bell Telephone Laboratories, New York (E. E. Schumacher, Repr.)**
Francis H. Hoffman, Sand Tech. Wright Aeronautical Corp., Div. of Curtis-Wright Corp., Paterson, N. J.
E. C. Hogan, American Brake Shoe & Foundry Co., New York
D. Wirth Jackson, Ass't. Shop Supt., U. S. Navy Yard, Brooklyn, N. Y.
Robert B. Parker, Safety Supv., American Brake Shoe & Foundry Co., New York
August Schlagenhauf, Fdy. Supt., Sperry Gyroscope Co., Inc., Long Island, N. Y.
Cyril Smith, Owner, Warren Foundry, Fairlawn, N. J.
E. B. Smith, Vice Pres., American Brake Shoe & Foundry Co., New York
Raymond F. Vines, Metallurgist, Ford Instrument Co., Long Island City, N. Y.

Michiana Chapter

***Moulds Brass Foundry Co., Benton Harbor, Mich. (Chet T. Horton, Gen. Mgr.)**

Northeastern Ohio Chapter

***Aluminum & Magnesium, Inc., Sandusky, Ohio (J. G. G. Frost, Pres.)**
P. M. Budge, Sand Fdy. Supt., The Permold Co., Medinah, Ohio
H. R. Doswell, Vice Pres. & Sec'y, The Permold Co., Medina
William T. Frier, Night School Instructor, General Electric Co., Erie, Pa.
J. A. Green, Supt., Byers Machine Co., Ravenna, Ohio
F. W. Jacobs, Lake City Malleable Co., Cleveland
***Motor Patterns Co., Cleveland (John S. Parker, Pres.)**
Victor J. Obrig, Ass't Met.—Sterling Foundry Co., Wellington, Ohio
***The Permold Co., Medina (E. G. Fahlman, Pres.)**
Fred Romano, Metallurgist, The Permold Co., Medina

Northern California Chapter

Ernest E. Dragon, Molder, Enterprise Engine & Foundry Co., San Francisco
M. W. Hulse, Sales Mgr., General Metals Corp., Oakland
G. W. Penning, Mgr., Enterprise Engine & Foundry Co., Richmond

*Company member.

Gregory Souza, Apprentice Coremaker, Enterprise Engine & Fdy. Co., San Francisco
William C. Townsend, Sr. Patt. Supv., Enterprise Engine & Fdy. Co., San Francisco

Northern Illinois-Southern Wisconsin

E. C. John, Fdy. Supt., National Sewing Machine Co., Belvidere, Ill.
***National Sewing Machine Co., Belvidere (R. E. Johnson, Chge. of Fdy. Office)**
A. P. Rose, Asst. Fdy. Supt., National Sewing Machine Co., Belvidere

Ontario Chapter

Lloyd E. Dimill, Galt Malleable Iron Co., Ltd., Galt.
***Otis-Fensom Elevator Co., Ltd., Hamilton, Ont. (E. G. Wyckoff, Wks. Mgr.)**
***Pollard Manufacturing Co., Ltd., Niagara Falls, Ont. (Harold Evans, Gen. Mgr.)**
Oliver W. Sneddon, Core Room Foreman, McKinnon Industries Ltd., St. Catharines, Ont.
A. R. Taylor, Sales Engr., American Air Filter Co., Inc., Toronto, Ont.
Francis J. Thompson, Galt Malleable Iron Co., Ltd., Galt

Philadelphia Chapter

***Caloric Gas Stove Works, Topton, Pa. (Nathan Klein, Mgr.)**
John Juppenlatz, Chief Met., Lebanon Steel Fdy., Lebanon, Pa.
James J. Kelley, Jr., Partner, Quaker City Foundry, Philadelphia
***Lobdell Co., Wilmington, Del. (H. L. Seaman, Pres.)**
John S. Schwab, Owner & Mgr., Eureka Brass Foundry, Camden, N. J.

Quad-City Chapter

Francis B. Anderson, Fdy. Apprentice, Caterpillar Tractor Co., Peoria, Ill.
Roland L. Anderson, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Virgil J. Ballerini, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Gordon Coursen, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
A. F. Delmastro, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Thomas A. Goff, Fdy. Apprentice Caterpillar Tractor Co., Peoria
Neal Hamilton, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Joe Isoardi, Jr., Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Morris J. Johnson, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
L. E. Kinsinger, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
John Miller, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Farrell J. Robb, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Vernon Schlosser, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Harold Wasson, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
John C. Welch, Fdy. Apprentice, Caterpillar Tractor Co., Peoria
Milton Zuercher, Fdy. Apprentice, Caterpillar Tractor Co., Peoria.

St. Louis District Chapter

George T. Baebler, Sand Control, Key Co., East St. Louis, Ill.
George B. Hayes, St. Louis, Mo., Sales Engr., Eastern Clay Products Inc., Eifort, Ohio

Southern California Chapter

L. J. Andrews, Supt., Griffin Wheel Co., Vernon
John E. Folsom, Ass't. Met., Kinney Iron Works, Los Angeles
Frank S. Mittl, Kinney Iron Works, Los Angeles

Twin-City Chapter

Rev. Aldrich Huhne, Fdy. Instructor, St. John's University, Collegeville, Minn.
Stanley J. Sitorz, Mgr., Prospect Foundry Co., Minneapolis
Arthur Schwartz, Student, University of Minnesota, Minneapolis
George Specht, Jr., Student, University of Minnesota, Minneapolis

Western New York Chapter

L. F. Dalton, Met., Symington-Gould Corp., Rochester
Mahlon F. Gentner, Patt. Shop, Sargent & Greenleaf, Inc., Rochester
James Marthia, Foreman, Jewell Alloy & Malleable Co., Inc., Buffalo
William J. McGennis, Field Engr., Electro Refractories & Alloys Corp., Buffalo

Wisconsin Chapter

Edwin Aukerknecht, Owner, Ajax Pattern Works, Waukesha
Ralph Calvano, Core Room Foreman, General Malleable Corp, Waukesha
Edward Drebus, Apprentice, Universal Foundry Co., Oshkosh
James Dumke, Ass't. Foreman, International Harvester Co., Milwaukee
***Kirsh Foundry Inc., Beaver Dam (H. L. Kirsh, Pres.)**
Hilbert G. Klein, Coremaker, Harnischfeger Corp., Milwaukee
Frank Kusnick, Fdy. Instructor, Milwaukee Vocational School, Milwaukee
Maurice Lazarus, Clerk, Allis-Chalmers Mfg. Co., Milwaukee
***Madison Brass Works, Inc., Madison (Harry F. Vogts, Gen. Mgr.)**
Kenneth Meyer, Casting Engr., Ampco Metal, Inc., Milwaukee
Frank J. Miller, Supv. of the Centrifugal Dept., Ampco Metal, Inc., Milwaukee
***Milwaukee Gas Light Co., Milwaukee (J. Benton Druse, Ass't. Mgr., Industrial Gas Sales Div.)**
Joseph Nawikas, Coremaking & Molding, Sheboygan Foundry Co., Sheboygan
Robert C. Onan, Milwaukee, Dist. Serv., Repr. Lindberg Engineering Co., Chicago
M. V. Sporakowski, Foreman, Bucyrus-Erie Co., So. Milwaukee
Irwin A. Vogds, Ampco Metal, Inc., Milwaukee
Frank A. Weber, Ass't. Foreman, International Harvester Co., Milwaukee

Outside of Chapters

***Acme Foundry Co., Chelsea, Mass. (James R. Bugley, Pres.)**
***Bovaird & Seyfang Mfg. Co., Bradford, Pa. (Richard H. Evans, Fdy. Foreman)**
Fred J. Clark, U. S. S. Prairie, c/o Postmaster, New York, N. Y. (Navy Repair Ship)
R. O. Collins Iron Works, Tallahassee, Fla. (R. O. Collins, Prop.)
***C. B. Cottrell & Sons Co., Westerly, R. I. (Arthur M. Cottrell, Jr., Sec'y.)**
***Gorham Manufacturing Co., Providence, R. I. (William Allebaugh, Fdy. Supt.)**
C. C. Hahn, Seneca, Pa. (Fdy. Supt., National Transit Pump & Machine Co., Oil City, Pa.)
S. M. Hefferan, American Brake Shoe & Foundry Co., Norwood, Mass.
Charles M. Kepner, Vice Pres., Duquesne Smelting Corp., Pittsburgh, Pa.
***Lake Shore Engineering Co., Marquette, Mich. (B. L. Watt, Wks. Mgr.)**
***Lindeman Power Equipment Co., Yakima, Wash. (Paul H. Austin, Gen. Mgr.)**
***Mountain State Steel Foundries, Parkersburg, W. Va. (H. F. Stratton, Pres.)**
***Rensselaer Valve Co., Troy, N. Y. (E. M. Tollefson, Plt. Mgr.)**
***Semler Co., Jeannette, Pa. (H. P. Semler, Pres.)**
***Skagit Steel & Iron Works, Sedro Woolley, Wash.**
C. S. Soong, Student, Purdue University, West Lafayette, Ind.
Lowell H. Stapf, Star Machine & Foundry Co., Amarillo, Tex.
Fred C. Strange, Mgr., Angeles Foundry Co., Port Angeles, Wash.
***Washington Iron Works, Seattle, Wash. (F. G. Frink, Sec'y.)**

*Company member.

Here's a Foundryman, 79, Still At His Job!

HIS name is Albert Anderson, and in the last war he was turning out bullets. Little over a year ago he was thinking of retiring, after 67 years in the foundry business, starting at the age of 12. But when the news of Pearl Harbor came through he changed his mind and today he is still busy, molding war castings at the Enterprise Iron Works, Los Angeles. He works five days a week, and at present is engaged in finishing molds.

Mr. Anderson's son, Earl Anderson, also is a foundryman . . . owner of the Enterprise company where his father is helping the war effort. Earl also is active in Pacific Coast foundry matters, being president of the Southern California Chapter of A.F.A. Needless to say, he is mighty proud of his father, 80 years old this coming February but doing his job.

Random Comments

A YEAR OF ACTION

ON DECEMBER 7, 1941, while we were pursuing our peaceful tasks and enjoying the comforts and privileges of our everyday normal lives, the word was flashed that the Japs had murderously attacked us at Pearl Harbor. We all were stunned. What the Japs did to us in that "stab in the back" attack is not yet fully known to the public, but a good idea has been gained from the publicity given to the event on the first anniversary of the attack.

The Japanese knew little of American psychology when they staged that attack because, by so doing, they gave America its slogan for the war, "Remember Pearl Harbor," which will take its place with the slogans of other wars, such as "Remember the Alamo," "On to Berlin," and others. The attack banded together the American people in the firm resolve to defeat the Japanese nation and with it its co-partners in crime, Germany, Italy and their weak-kneed satellites.

The fact that we might be defeated in this war never occurred to us. We had the men but what about equipment? Could industry over night switch its activities to the manufacture of war materiel to give our men the necessary guns, tanks, airplanes, ships, bullets, and other equipment, to wage a successful war? Records of the past year are the answer.

There is but one customer of American industry today and that is Uncle Sam. Each company is vying with the other for production records. The cry has become not "too little, too late," but "the most of the best."

It is only fitting and proper that at this time, one year after the declaration of the war, when we begin the second year (and, we hope, the last war year), that we take stock of ourselves. The foundry industry has done its part in the war program and will continue to expand its contributions through more and better castings. But we should not be satisfied with our present records. Tomorrow they should be a past record.

Each day should set a new production record to shoot at. Production in any industry today is difficult because of restrictions on materials, but this should not be a deterrent to us. It should only increase our determination to do more regardless of the odds. We know that this war must be fought and victoriously, or our mode of living and our manner of government will disappear from the earth.

Let's make it a *short* war. Let's give our men everything they need and make it the best possible, so that our own loved ones and those of our neighbors may be returned to us safely. A short delay and the lack of some piece of equipment may cost a life—possibly your son's or mine.

MAKE THE FOUNDRY 100 PER CENT 10 PER CENTERS

YOU know, of course, that the Treasury Department of our Government is making a drive to secure 100 per cent cooperation of industry in their Payroll Deduction Plan. Employees of many companies in the foundry industry have made it possible for their respective companies to boast 100 per cent participation in the 10 per cent Treasury Deduction Plan for War Bonds. However, the foundry industry is not participating 100 per cent in all its units.

When we consider that our sons, daughters, brothers, sisters, friends and co-workers are giving their lives so that the ideals of our country and our mode of living may be maintained in the future, a 10 per cent salary deduction is but a small contribution to supply them with the best possible equipment so that there will be every chance that their lives may be saved.

Let us make the foundry industry the first industry in the country to be *100 per cent 10 per centers!*

If you are not participating now, resolve to do so in the immediate future. If your company is not participating in the salary deduction plan, make yourself a committee of one to find out why and urge that they do. Talk it over among your fellow employees. Urge them to make this small sacrifice so that the war will be over as quickly as possible and our friends and relatives return to us safely, so that we may continue to enjoy the freedom and benefits that this country has always granted its citizens.

The Caterpillar Tractor Co., Peoria, Ill., Pattern Shop receives a "100% Pennant" for 100% participation in the Payroll Deduction Plan. For the Treasury Department, Herman Walker (right) presents the award to E. M. Wycoff (left), contributing largest percent of salary, and Leonard Feldman of the plant Labor-Management Committee.

Government Orders of the Day for Industry

More detailed information on any of the following news briefs may be obtained by writing direct to the U. S. Information Center, 1400 Pennsylvania Ave., N.W., Washington, D. C. For prompt reply, it is suggested that requests be made by Release numbers shown.

New Foundry Equipment Chief in WPB—Thomas Kaveny, Jr., Herman Pneumatic Machine Co., Cleveland, has succeeded W. R. Bean as Chief of the Foundry Equipment Unit, Tools Section, WPB, in Washington, D. C. Mr. Bean, chief of the unit for over a year, has returned to Whiting Corporation, Harvey, Ill., as Vice-President.

Controlled Materials Plan (WPB)—Booklets of detailed instructions for filling out the Bills of Materials required by the new Controlled Materials Plan will be made available through regional meetings conducted by CMP division of WPB. Copies later obtainable through WPB field offices. *(Release No. T-1262)*

OPA Branches Combined (OPA)—A single new Non-Ferrous Metals Branch, headed by John D. Sumner, has been formed as consolidation of former Copper, Aluminum and Ferro-Alloys Branch and the Zinc, Lead and Tin Branch of OPA Industrial Materials Price Division. *(Release No. OPA-T-393)*

Scrap Order Corrected (WPB)—Iron and Steel Scrap Order as amended Oct. 13 does not require filing of Form PD-149A, correction to previous requirement made under Amend. 1 to Gen. Pref. Order M-24, issued Nov. 18. *(Release No. T-1229)*

Scrap Sales Over 10 Tons Monthly (WPB)—Scrap dealers and industrial companies must secure permission for sale of scrap and re-rolling rail in excess of 10 tons a month, under Order L-88. *(Release No. T-1263)*

Scrap Sellers' Freight Tax (OPA)—Jobbers, dealers and distributors of iron and steel scrap authorized to treat recently imposed 3% tax on transportation same as a freight rate increase, to be passed on to consumers, by Amend. 9 to Rev. Price Sched. 4, eff. Dec. 1. *(Release Nos. OPA-1217, OPA-T-388)*

More Zinc Restrictions (WPB)—Further restrictions have been placed on use of zinc for a variety of automotive parts, and building and industrial materials, under Conservation Order M-11-b as amended, issued Nov. 27, the order also covering protective coating and galvanizing. *(Release No. WPB-2178)*

Aluminum Purchase Methods Changed (WPB)—To facilitate transition from PRP to Controlled Materials Plan, certain changes were announced Dec. 11 in method of authorizing PRP units to purchase aluminum, magnesium, steel and copper during first quarter 1943. *(Release No. T-1368)*

Copper Order Corrected (WPB)—Restrictions on use of copper and copper base alloy building materials clarified by Amend. 1 to Cons. Order M-9-c-4 issued Nov. 18, correcting omission of words in amended order of Oct. 27. *(Release No. T-1224)*

Copper Regulations Explained (WPB)—To clarify Press Release OPA-T-264, if necessary Government will requisition all copper and copper base alloy products, primary or fabricated, except products whose cost to holder in primary form was above 28 and 30 cent maximums. *(Release No. WPB-2241)*

Duluth Pig Iron Price Base (OPA)—Maximum basing point price of $24 per gross ton for basic pig iron at Duluth is established in Amend. 3 to Rev. Price Sched. 10 (Pig Iron), eff. Dec. 4. *(Release No. OPA-T-360)*

Western Ferrosilicon Rate (OPA)—Eastern and Western producers of ferrosilicon placed on equal basis insofar as freight allowances are concerned, by Amend. 70 to Supp. Reg. 14, eff. Dec. 8. *(Release No. OPA-T-377)*

Complete Graphite Control (WPB)—Complete control over distribution and use of graphite involved in Conservation Order M-61, as amended Dec. 4. *(Release No. T-1330)*

Fluorspar Ore Exempted (OPA)—Fluorspar ores are exempted from price control under Amend. 42 to Supp. Reg. 1, eff. Nov. 23. *(Release No. OPA-T-358)*

Complete Carbon Steel Control (WPB)—Complete control over production and delivery of electric furnace carbon steel established in amended Conservation Order M-21-a. Control of carbon and alloy tool steels now under Order M-21-h, including provisions formerly in M-21-a, and entire Order M-14 revoked. *(Release No. T-1391)*

Chrome Steel Deliveries Restricted (WPB)—Permission to deliver corrosion or heat-resistant chrome steel restricted to preference rating of AA-5 or higher, and use permitted only with proper rating, under amendment to Order M-21-d, Nov. 18. *(Release No. T-1230)*

Welding Rod Control Revoked (WPB)—Limited control of distribution of welding rods and electrodes was abandoned Dec. 9 by revocation of Order L-146. *(Release No. T-1353)*

Calcium Carbide Allocated (WPB)—Calcium carbide is placed under allocation control, eff. Jan. 1, 1943, and deliveries prohibited without specific authorization except for monthly shipments of 10 tons or less. Order M-190. *(Release No. T-1359)*

Tighten Laboratory Equipment Control (WPB) — Greater control over purchase of laboratory equipment was effected by Limitation Order L-144, as amended Dec. 5. *(Release No. T-1338)*

Laboratory Fees (OPA)—Fees charged by independent laboratory for assays or analyses may be paid by buyers of non-ferrous metal scrap, in addition to maximum price, if laboratory impartially represents both buyer and seller. Announcement Dec. 12. *(Release No. OPA-T-402)*

Builders' Hardware Lines Cut (WPB) — Extensive simplification program reduces builders' hardware lines to approx. 3500 items, from present total of 27,000. Sched. 1 of Order L-236, eff. Jan. 15, 1943. *(Release No. WPB-2224)*

Toys and Parts Banned (WPB)—No more toys, games or repair or replacement parts for toys or games may be produced using certain metals and critical materials, except joining hardware of iron or steel, under Order L-81, as amended Nov. 25. *(Release No. T-1282)*

Certify Repair Parts Orders (WPB)—Purchase orders for repair and maintenance parts for many industrial equipment items must have certificate showing nature of purchase, under Limitation Order L-123, as amended, eff. Dec. 8. *(Release No. T-1255)*

Electric Motor Purchases (WPB) Purchasers of electric motors must show that H.P. of motor applied for is no greater than required to do the job, by provision in Gen. Cons. Order L-221, eff. Dec. 10. *(Release No. T-1329)*

Reduction Gears Regulation (OPA)—Maximum prices for gears, pinions, sprockets and speed reducers were included in over-all regulation for machinery by Amend. 62 to MPR 136, eff. Dec. 11. *(Release No. OPA-1237)*

Cast Iron Boiler Maximums (OPA)—Maximum prices for cast iron coal and oil burning boilers and radiators were fixed by Max. Price Reg. 272, eff. Nov. 23. *(Release No. OPA-T-311)*

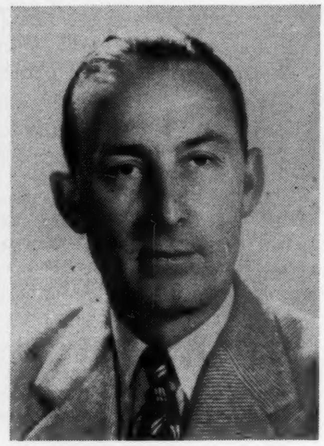
Hard-Surface Materials Restricted (WPB)—Deliveries of hard-facing materials restricted to orders rated AA-5 or higher under Order L-223, issued Dec. 2. *(Release No. T-1314)*

Basing Prices on Wage Rises (OPA)—Rules for employers seeking price adjustments based on wage or salary increases and requiring approval of NWLB are given in Supp. Order 28, eff. Nov. 18. *(Release No. OPA-1149)*

CHAPTER OFFICERS

J. Cunningham
International Malleable Iron Co., Ltd., Guelph, Ont.
Director
Ontario Chapter

H. Goodwin
Medart Co.,
St. Louis, Mo.
Director
St. Louis District Chapter



Earl D. Shomaker
Kay-Brunner Steel Products, Inc.,
Alhambra, Calif.
Director
Southern California Chapter

Harry E. Ladwig
Allis-Chalmers Mfg. Co.,
Milwaukee, Wis.
Secretary
Wisconsin Chapter

A. D. Matheson
French & Hecht, Inc.,
Davenport, Iowa
Chairman
Quad City Chapter

Wm. Beiser
Reliance Foundry Co.,
Cincinnati, Ohio
Director
Cincinnati Chapter

Emile Drolet
La Cie F. X. Drolet, Ltd.,
Quebec, Que.
Director
Eastern Canada and Newfoundland Chapter

V. C. Bruce
Buckeye Products Co.,
Elkhart, Ind.
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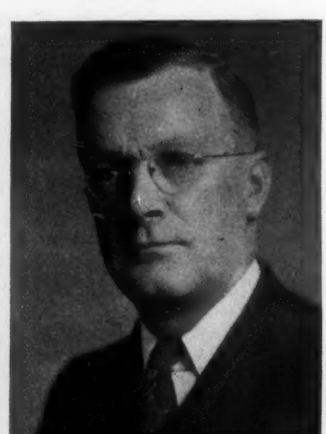
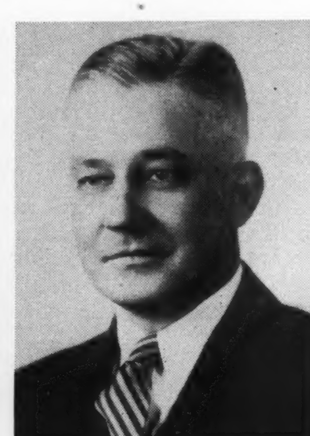
Michiana Chapter

G. Ewing Tait
Dominion Engineering Works, Ltd.,
Lachine, Que.
Director
Eastern Canada and Newfoundland Chapter

Fred W. Pascoe
Westinghouse Electric & Mfg. Co.,
Cleveland, Ohio
Director
Northeastern Ohio Chapter

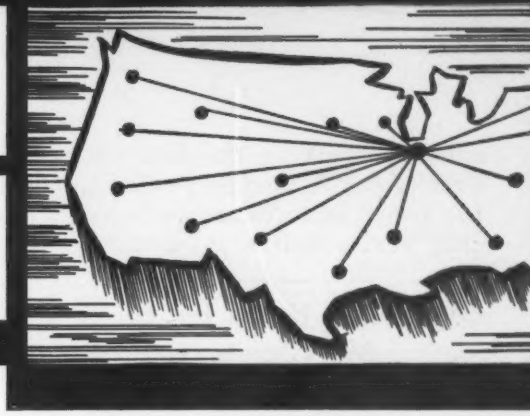


W. C. Perrot
Canada Iron Foundries, Ltd.,
Three Rivers, Que.
Director
Eastern Canada and Newfoundland Chapter



Frank E. Bates
Worthington Pump & Machinery Corp., Buffalo, N. Y.
Vice-Chairman
Western New York Chapter

Chapter Activities



Casting Defects Discussed Before the Ontario Chapter

By G. L. White,* Toronto, Ontario

JOHN L. LOWE, Battelle Memorial Institute, Columbus, Ohio, and member of the A.F.A. Committee on Analysis of Casting Defects, proved an interesting guest speaker at the final 1942 meeting of Ontario Chapter, second largest in the history of the chapter with over 130 present, held November 27 at the Royal Connaught Hotel, Hamilton, Ont. Vice-Chairman C. C. MacDonald, Frederic B. Stevens of Canada, Ltd., Toronto, presided in the absence of Chairman McFayden, assisted by technical chairman J. A. Wotherspoon, Imperial Iron Corp., Ltd., St. Catherines, Ont.

Mr. Lowe gave the list of 36 casting defects accepted by his committee, and dealt with defiinitions and causes of the first four types of defects, as follows: (1) Blows, gas holes, pin holes, blisters; (2) scabs, buckles, rat-tails, pull-down, blacking scabs; (3) cuts and washes due to gas and metal erosion; (4) inclusions —sand, slag, foreign materials. These four types of defects have been discussed in previous issues of *American Foundryman* by various members of the committee on casting defects.

The discussion that followed brought out several suggestions for Mr. Lowe's committee. It was urged that members of the chapter study the reports on casting defects and write the committee on any points of disagreement.

*Westman Publications, Ltd., and Secretary-Treasurer, Ontario Chapter.

Non-Ferrous Discussion At Central New York

By L. E. Hall,† Syracuse, N. Y.

FIFTY members and guests of the Central New York Chapter turned out for the November 13 meeting at the Onondaga Hotel, Syracuse, with Chapter Chairman Lloyd D. Wright, U. S. Radiator Corp., Geneva N. Y., presiding.

Non-ferrous castings practice was the main subject of the evening, presented by the guest speaker, Wm. George, R. Lavin & Sons. Mr. George covered sand and melting methods, types of flux, pouring temperatures, gating, and types of defects often found in non-ferrous work and probable causes and remedies for them. Types and properties of various test bars were explained, and causes of porosity in Navy "G" and "M" metals also were discussed.

In the short business meeting preceding the main topic, the chapter was invited to attend the annual stag party of the Western New York Chapter in Buffalo during January. The invitation was presented by three members of that chapter: Chairman Ralph T. Rycroft, Jewell Alloy & Malleable Co., Inc., Buffalo; Vice-Chairman Frank E. Bates, Worthington Pump & Machinery Corp., Buffalo, and Ed P. Meade, Sargent & Greenleaf, Inc., Rochester, N. Y.

Mr. Roycroft, on request, explained formation of his chapter's War Problems Committee and its purpose, as a result of which the Central New York Chapter voted for appointment of such a committee of its own. Other subjects discussed included the work of the A.F.A. Cupola Research Committee, and

†Syracuse Chilled Plow Co., and Secretary of the Central New York Chapter.

(Photos courtesy Steve Hutchinson, Hutchinson & Sons)

A few personalities who attended the November 27 meeting of the Ontario Chapter at Hamilton, Ontario, to make this meeting the second largest in the history of the organization. Center—Guest speaker John L. Lowe, Battelle Memorial Institute, Columbus, Ohio, addresses the members.

announcement of the fact that dues of A.F.A. members entering the armed services are automatically suspended for duration.

Quad City Holds Its Big Christmas Party

By H. L. Creps,* Moline, Ill.

NEARLY 350 members and guests of the Quad Cities Chapter of A.F.A., coming from the famed four cities and surrounding territory, gathered at the Blackhawk Hotel, Davenport, Iowa, on December 11 for the chapter's annual Christmas party. Chairman Alex D. Matheson, French & Hecht, Inc., Davenport, presided over the dinner and a variety of entertainment.

The special program was arranged by a committee including the following: A. H. Putnam, A. H. Putnam Co., Rock Island, Ill.; John H. Ploehn, French & Hecht, Inc., Davenport; Chairman Matheson; B. O. Collins, A. H. Putnam Co.; H. L. Creps, Frank Foundries Corp.; J. C. Gore, Werner G. Smith Co.; C. E. VonLuhrte, Chicago Retort & Fire Brick Co., Davenport; Secretary-Treasurer J. Morgan Johnson, Tri-City Manufacturers Assn., Moline; C. H. Burgston, Deere & Co., Moline; and Martin Liedtke, International Harvester Co.

*Frank Foundries Corp., and Recording Secretary for the Quad City Chapter.

Chicago Chapter Skids to December Meeting on Chemistry of Refractories

By Frank E. Wartgow,† East Chicago, Ind.

BRAVING slippery streets and the unaccustomed hazards of gas rationing, 125 members and guests of the Chicago Chapter turned out December 7 for an interesting and educational talk on the "Chemistry of Refactories." A. R. Blackburn, research engineer, Ohio Experimental Station, Columbus, Ohio, presented much valuable information, and if the one point of "how much harm so little can do" was gained by each member, it was an evening well spent.

Chairman Al C. Gierach, American Manganese Steel Div., Chicago Heights, Ill., presided and introduced community singing to help make the evening entertaining. The serious purpose of these meetings was recalled, however, when a solemn tribute was paid during the dinner hour to those in the armed services who have given their lives for their country.

November Meeting

An overflow crowd opened the 1942-43 season of the Chicago Chapter with enthusiasm, attracted by an exceptionally well planned series of round-table meetings. The number of guests was unusually large, including 50 from the Washburne Trade School, Chicago, and others from as far away as Joliet, Peoria and Milwaukee.

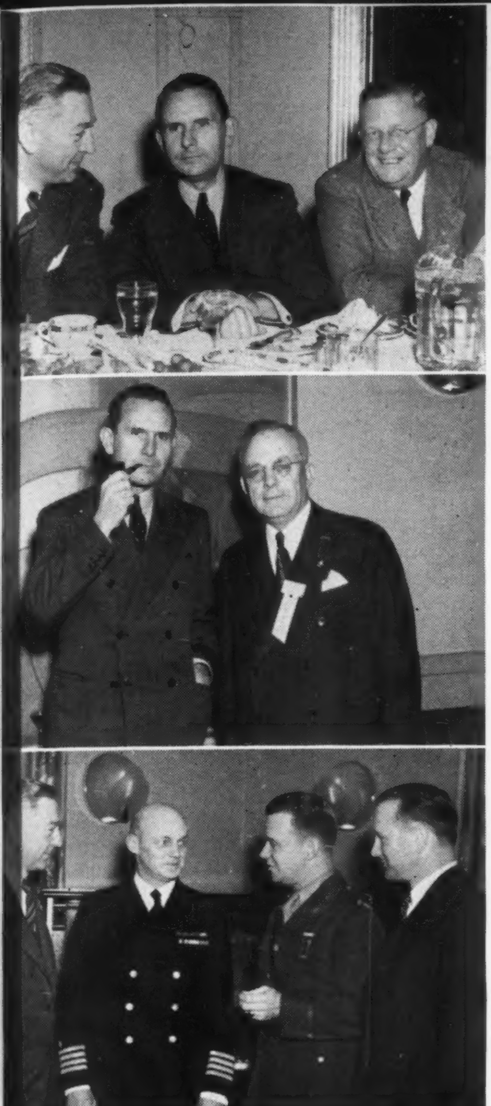
A. W. Gregg, Whiting Corp., Harvey, Ill., led discussion at the steel session, the general subject being "Melting Steel by the Triplex Method." At the gray iron session an interesting talk on "Casting Defects, Their Causes and Cures" was presented by W. A. Hambley, Allis-Chalmers Mfg. Co., West Allis, Wis., illustrated with slides and actual castings.

Discussion at the malleable session centered upon "Effects of Scarcity of Preferred Melting Stock upon Melting Operations and Physical Properties," and methods of overcoming difficulties. Leon J. Wise, Chicago Malleable Castings Co., Chicago, led the discussion, with practically all malleable plants in the area represented at the meeting.

"Silicon Bronzes" was the main topic of the non-ferrous group, under leadership of H. M. St. John, Crane Co., Chicago.

(Photos courtesy Ruth V. Scheuber, American Manganese Steel Div.)
When the Chicago Chapter held its December meeting on the historic anniversary of Pearl Harbor, December 7, 125 members and guests gathered to hear A. R. Blackburn, Ohio Experimental Station, Columbus, Ohio, speak on the "Chemistry of Refractories."

†American Steel Foundries, and Secretary, Chicago Chapter of A.F.A.



(Photos courtesy John Bing, A. P. Green Fire Brick Co.)

Personalities at the Wisconsin war conference banquet at Milwaukee, November 20, sponsored jointly by the Wisconsin Chapter. Top, Left to Right—B. D. Claffey, General Malleable Corp., Waukesha, Wis., and National Director of A.F.A.; James S. Duncan, Massey-Harris, Ltd., Toronto; R. L. Rote, president, Wisconsin State Chamber of Commerce. Center, Left to Right—James S. Duncan; Wm. J. Peterson, Executive Secretary, Wisconsin State Chamber of Commerce. Bottom, Left to Right—B. D. Claffey; Capt. D. D. Dupre, Prof. of Naval Science and Tactics, Marquette University, Milwaukee; Maj. E. M. Culligan, Selective Service System, Washington, D. C.; Chapter President Geo. K. Dreher, Ampco Metal, Inc., Milwaukee.

Discussion concerned principally proper melting practices, elimination of impurities, and how to guard against contamination by other metals in the non-ferrous melt.

The new pattern division's session developed good interest, dealing mainly with the A.F.A. apprentice contest. Discussion leaders were E. B. Sabey, Miehle Printing Press & Mfg. Co., Chicago; L. G. Gustafson and Martin Rintz, both of Continental Roll & Steel Foundry Co., East Chicago, Ind.

Steel Facts Studied By Western New York

By John R. Wark,* Buffalo, N. Y.

IMPORTANT information on "Deoxidation of Carbon and Alloy Steels" occupied attention of 70 members and guests of Western New York Chapter at the regular monthly meeting on December 4, at Hotel Touraine, Buffalo, N. Y. Chairman Ralph T. Rycroft, Jewell Alloy & Malleable Co., Buffalo, presided.

Following dinner a number of committee reports were received: from Henry F. Sproull, A. P. Green Fire Brick Co., Buffalo, on the annual stag party in January; Harold J. Struebing, Electro Refractories & Alloys Corp., Buffalo, on membership; Vice-Chairman Frank E. Bates, Worthington Pump & Machinery Corp., Buffalo, on program; and Wm. S. Miller, Chas. C. Kawin Co., Buffalo, as chairman of the chapter's War Problems Committee. Mr. Miller announced the W.P.B. meeting of all technical societies in the district was scheduled for January 11.

Walter Crafts, Union Carbide & Carbon Research Laboratories, was the main speaker of the occasion. In introducing him, Theodore Burke of Otis Elevator Co., Buffalo, stated that Mr. Crafts was a diligent searcher for truth in metallurgy, had matriculated at Yale and M.I.T., prepared many papers on steel, and has two bad habits, golf and pinochle. The speaker offered valuable ideas on deoxidizers, nitrogen and hydrogen gases, sulphide and oxide diagrams, manganese and aluminum, reduction of oxygen, inclusions, and over-reduced steel. High aluminum treatment will not be successful, he said, unless the metal is thoroughly boiled first.

*Queen City Sand & Supply Co., and Secretary of A.F.A. Western New York Chapter.

Urges the Deferment Of Essential Workers

INDUSTRIAL executives have a patriotic duty to ask deferment for employees necessary for maximum war production, Maj. E. M. Culligan, public relations officer of National selective service, declared at the annual banquet of the Wisconsin State Chamber of Commerce in Milwaukee, November 20. The Wisconsin Chapter of A.F.A. was one of the organizations sponsoring the event.

Major Culligan declared that employers should fight for retention of technically trained specialists essential to continued production, and if necessary should appeal adverse decisions of local draft boards.

Another speaker at the conference was James S. Duncan, Massey-Harris, Ltd., Toronto, Ontario, who declared that the job of regaining liberties voluntarily surrendered during wartime is second in importance only to the wartime necessity of controlled economy. At the banquet session 32 Wisconsin firms were honored for having won Army-Navy, Ordnance and Maritime Commission awards.

Aircraft Problems at Southern California

By E. M. Hagener,† Los Angeles, Calif.

CHAPTER Chairman Earl Anderson, Enterprise Iron Works, Los Angeles, presided over a full house of members and guests at the November 19 meeting of the Southern California Chapter, held at the Elks Club, Los Angeles. The evening was given over to the vital subject of 'War Effort in the Aviation Industry," with a message brought direct from North American Aviation, Inc., by Robert Monroe, director of material.

Mr. Monroe stated that while our planes have proven superior in combat, the need today is for faster production, which involves pooling of materials, engineering and resources. It is common practice among plane manufacturers, he said, to send parts to other companies to get a plane off the ground today even though that part will be needed by the sender tomorrow. This spirit has resulted in formation of the Aircraft War Production Council among Southwest plane

†General Metals Corp., and Secretary of Southern California Chapter.

plants, and an East Coast Aircraft War Production Council pooling resources of eastern factories. The speaker recommended adoption of similar cooperative spirit by foundrymen.

Through courtesy of Bell Aircraft Corp., Buffalo, N. Y., an exciting film "Cannon on Wings" was shown, in technicolor.

Dietert Is Speaker at Northern California

By Geo. L. Kennard,* San Francisco

SOME said "it can't be done here," but the Northern California Chapter "put the boys through the wringer" with two meetings in November, only a week apart, the second on November 27, the day after Thanksgiving. In spite of heavy demands on everyone's time and turkey three times in a week, the "dim out" did not dim enthusiasm over seeing Harry W. Dietert's latest film on reactions of sand under high temperatures.

The chapter's Russian-American program chairman, Serge Kovaleff of Enterprise Engine & Foundry Co., South San Francisco, showed how a Russian works when filled with enterprise, having his program all printed before appointing Alex Homberger, the Swiss sand specialist of General Metals Corp., speaker of the evening. Alex shifted his linguistic gears and took over like a professional.

Harry Dietert, guest speaker of the evening, presented his latest film showing how sand reacts to high temperatures under varying conditions, explaining what has been done by the A.F.A. sand control committee under able leadership.

*Northern California Foundrymen's Institute, and Secretary-Treasurer of A.F.A. Northern California Chapter.

Michiana Subject Is Jobbing Foundry Work

By K. H. Barnes,† Mishawaka, Ind.

THE broad scope of jobbing foundry work proved the interesting topic for discussion at the December 1 meeting of the Michiana Chapter, held at Hotel La Salle, South Bend, Ind. Chapter Chairman H. Klouman, Michiana Products Corp., Michigan City, Ind., presided and introduced the principal speaker of the evening, C. F. Carson of the National Supply Co., Toledo, Ohio.

Mr. Carson's talk, dealing with jobbing work and especially production of large castings, included patternmaking, types of sand, method of ramming, thickness of metal sections, types of facings, methods of skimming, flasks, cores, drying methods, gating and feeding heads. A round-table discussion followed the speaker's presentation, with a number of members remaining after adjournment for solution of individual problems.

R. E. Kennedy, National Secretary of A.F.A., Chicago, attended the meeting and discussed the work of A.F.A. chapters, both in the U. S. and in Canada. He also asked cooperation of the chapter in assisting W.P.B. to obtain data on the use of gray iron castings at high temperatures in connection with the study announced on page 15 of this issue.

†American Foundry Equipment Co.; reporting for Michiana Chapter.

Dietert Talks Before Chesapeake Chapter

By F. G. Bruggman,** Baltimore, Md.

WELL over 100 members and guests attended one of the finest meetings of the Chesapeake Chapter yet held, on December 4 at the Engineers Club, Baltimore, Md., to hear Harry W. Dietert, H. W. Dietert Co., Detroit, talk on cores. Chapter Chairman J. E. Crown, U. S. Navy Yard, Washington, D. C., presided and introduced the speaker, whose talk will long be remembered as a feature of a "bang-up" meeting.

Mr. Dietert showed a number of slides and explained the operation of the dilatometer, discussing the uses of various additions of material to sand to prevent cracking and burning-in of cores. He pointed out that control of core sand under actual working temperatures is essential to production of good castings, and that heaps should be checked constantly to insure consistent mixtures. Following the speaker's presentation, several questions of members were answered.

**Industrial Supply Corp., and Chapter Reporter for Chesapeake Chapter of A.F.A.

(Photos courtesy Fred G. Bruggman, Industrial Supply Corp.)

'Round about the December 4 meeting of the Chesapeake Chapter in Baltimore, at which H. W. Dietert, Harry W. Dietert Co., Detroit, was guest speaker. Top Left, Left to Right—J. M. Graham, Ajax Metal Co., Philadelphia; J. L. McCleary, Frick Co., Waynesboro, Pa.; Bert S. Reed, Whitehead Bros. Co., Philadelphia. Top Right—Guest speaker Harry W. Dietert. Bottom Left—Past Chairman E. W. Horlebein, Gibson & Kirk Co., Baltimore, presents a free meal ticket to winner of the lucky number. Bottom Right, Left to Right—Edw. Hartman, Pangborn Corp., Hagerstown, Md.; R. E. Mortin, Pangborn Corp.; Howard F. Taylor and Robt. E. Morey, Naval Research Laboratory, Washington, D. C.; C. M. Saeger, Jr., Bureau of Standards, Washington; Ira Pike and Frank Kaiss, Pangborn Corp.

Urges Cooperation of Pattern Shop and Foundry at Philadelphia

By Wm. S. Thomas,* Philadelphia

DESPITE the weather, like a London fog, 75 members and guests attended the December 11 meeting of the Philadelphia Chapter at the Engineers Club there. Two able speakers made attendance very worth while. Taraknath Das, a native of India and graduate of Georgetown University, Washington, D. C., spoke on the underlying reasons for the war, his comments provoking serious thought.

E. J. Brady, Alloy Rods Co., York, Pa., and formerly of Western Foundry Co., Chicago, discussed "Cooperation of the Engineer, Patternmaker and Foundryman." He emphasized the importance of close cooperation in designing castings to reduce losses and increase production, pointing out how such simple matters as draft shrinkage, allowance, and use of paper fillets influence a foundry's ability to produce better castings to closer dimension. Shrinkage allowances, size and length of core prints and use of crush strips should be fully discussed, since these requirements vary according to pattern design.

Timers or "tell-tales" of the right kind on patterns are most important, Mr. Brady stated, and ram-up cores have an important place on certain patterns. Good patterns should show location and thickness of chaplets to be used, and bosses incorporated so as to have sufficient metal surrounding the chaplet to make a good weld.

November Meeting

The largest attendance of any previous regular meeting turned out for Philadelphia Chapter's November 13 meeting at the Engineers Club, with two excellent speakers on the program. Harold M. Smith, Dean and co-principal of Bordentown Military Institute, Bordentown, N. J., gave an impressive talk on the duty of the home front to do its job for the men fighting overseas.

Technical Chairman John A. Sweeney, Florence Pipe Foundry & Machine Co., Florence, N. J., introduced the technical speaker of the evening, Stanley H. Bullard of Bullard Machine Co., Bridgeport, Conn. Mr. Bullard's paper, "Present-Day Methods of Foundry Operation," outlined equipment used by his company in producing castings.

The members found especially interesting the method of charging 3 cupolas, mixing coke, scrap, iron, etc., together in each charge with no attempt to keep the materials separate. Considerable saving in charging labor thus was obtained, Mr. Bullard stated, with no appreciable difference in the melting rate or quality of iron produced.

*North Bros. Mfg. Co., and Chairman of Publicity Committee, Philadelphia Chapter.

NEO Turns Out Strong For Christmas Party

By Edwin Bremer,† Cleveland, Ohio

WITH ticket sale for the Annual Christmas Party of the Northeastern Ohio Chapter limited to seating capacity, 1000 members and guests attended the dinner and floor show, December 10, at the Hotel Carter, Cleveland. In the festive spirit of the season, the evening began with a fine turkey dinner, after which "Bob" Robinson, Werner G. Smith Co., Cleveland, and Chairman of the Entertainment Committee, doubled in brass and entertained with piano selections and songs.

For two hours thereafter a splendid floor show entertained the party, with such a fine array of acts that the members agreed it was the best show of Bob Robinson's career. For a grand finale the entire assemblage raised the rafters with "Star Spangled Banner."

†*The Foundry*, and Chairman of Publicity for the Northeastern Ohio Chapter of the Association.

Student Chapter of U. of Minnesota Meets

THE Association's Student Chapter of the University of Minnesota held a meeting on November 17, with interesting talks by Professor Fulton Holtby and H. F. Scobie, foundry instructors and members of the A.F.A. Messrs. Holtby and Scobie explained the opportunities of the foundry field as a vocation for technical engineers

Chapter Membership Progress Report

(Figures below do not include membership of non-chapter areas)

Chapters	Membership on 7/1/42	Members Added During 7/1 to 7/15	7/16 to 8/15	8/16 to 9/15	9/16 to 10/15	10/16 to 11/15	11/16 to 12/15	Total New Chapter Members to Date
Birmingham	231	0	2	0	2	6	4	14
Central Indiana	161	0	1	0	4	1	0	6
Central New York	111	0	1	1	0	0	2	4
Chesapeake	185	0	0	1	1	3	2	7
Chicago	505	3	3	10	9	15	8	48
Cincinnati	198	0	1	3	3	4	5	16
Detroit	286	1	0	5	4	3	6	19
E. Canada and Newfoundland	105	2	2	1	39	7	23	74
Metropolitan	222	1	6	3	4	5	9	28
Michiana	95	0	1	5	0	3	1	10
Northeastern Ohio	375	1	1	1	5	4	10	22
Northern California	154	11	5	3	3	2	5	29
Northern Illinois-Southern Wisconsin	67	0	5	1	1	2	3	12
Ontario	149	3	0	3	3	0	6	15
Philadelphia	206	0	0	0	2	1	5	8
Quad-City	178	0	1	1	13	2	16	33
St. Louis	175	1	1	3	5	2	2	14
Southern California	232	0	8	6	0	4	3	21
Toledo	75	0	1	0	1	3	0	5
Twin-City	86	0	3	0	1	1	4	9
Western Michigan	95	0	0	2	6	1	0	9
Western New York	166	3	1	0	3	7	4	18
Wisconsin	465	6	8	9	22	18	12	75
Total	4522	32	51	58	131	94	130	496

Mechanical and metallurgical engineering students of the University of Minnesota, members of the only A.F.A. Student Chapter, at their meeting Nov. 17.

and the presentation was of intense interest to the 24 in attendance.

The officers of the chapter are President Harry R. Dahlberg and Secretary Miles B. Olson. Membership of the chapter is made up of those students who, while taking regular courses in mechanical and metallurgical engineering, are enrolled in special foundry classes developed at this school, which has been foremost in its foundry training work.

St. Louis Talks About The Cupola for Steel

By J. H. Williamson,* St. Louis, Mo.

DISCUSSION at the November 12 meeting of the St. Louis District Chapter of A.F.A., held at the De Soto Hotel, St. Louis, centered mainly on "The Cupola's Place in Steel Production Today." Guest speaker on this subject was A. W. Gregg, Whiting Corporation, Harvey, Ill., who was introduced by Chapter Chairman C. B. Shanley, Semi-Steel Casting Co., St. Louis.

Mr. Gregg outlined briefly the growth in size and number of continuous hours run of cupolas in the past several years, and also covered thoroughly theoretical aspects of cold blast, hot blast and dry blast cupolas. In addition, he described the cupola's place in duplexing, triplexing and with converters. His movie of a duplexing system in operation in a large St. Louis steel plant proved especially interesting to the attendance.

In a short business session prior to the technical program, the A.F.A. Cupola Research Program was discussed and a number of recent new members introduced.

*M. A. Bell Co., and Secretary-Treasurer, the St. Louis District Chapter.

Cincinnati Deals With Ferrous and Non-Ferrous

By Henry M. Wood,† Cincinnati, Ohio

DRAWN by opportunities to discuss both ferrous and non-ferrous problems in separate group sessions, 80 members and guests of the Cincinnati District

†W. W. Sly Mfg. Co., and Secretary of the Cincinnati District Chapter.

War Problems Committees of A.F.A. Chapters

Central Indiana

Chairman, Harold Lurie, Cummins Engine Co., Columbus.

Castings Specifications

Harold Lurie, Cummins Engine Co., Columbus.

Gray Iron

R. H. Bancroft, Perfect Cirlce Co., Newcastle.

Malleable Iron

S. C. Wasson, National Malleable & Steel Castings Co., Indianapolis.

Steel Castings

I. R. Wagner, Electric Steel Castings Co., Indianapolis.

Brass

Chas. Beckett, Beckett Bronze Co., Muncie.

Aluminum and Magnesium

Chas. Gisler, C. & G. Foundry & Pattern Works, Indianapolis.

Chesapeake

Chairman, E. W. Horlebein, The Gibson & Kirk Co., Baltimore, Md.

Steel

H. F. Taylor, Naval Research Laboratory, Washington, D. C.
T. C. Worley, Bethlehem Steel Corp., Sparrows Pt., Md.

Gray Iron

Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.
F. G. Roemer, The Balmar Corp., Baltimore, Md.

Malleable Iron

David Tamor, American Chain & Cable Co., York, Pa.

Brass, Bronze & Aluminum

Earl J. Bush, Washington Navy Yard, Washington, D. C.
A. H. Hesse, Naval Research Laboratory, Washington, D. C.

Patterns

J. O. Danko, Danko Pattern & Mfg. Co., Baltimore, Md.
J. A. Heard, Crown Cork & Seal Co., Inc., Baltimore, Md.

Welding

Clyde L. Frear, Bureau of Ships, Navy Dept., Washington, D. C.

Job Training

D. F. Lane, Bethlehem Steel Corp., Sparrows Point, Md.
Geo. L. Webster, Baltimore Polytechnic Inst., Lutherville, Md.

Sand

C. M. Saeger, Jr., Bureau of Standards, Washington, D. C.

Chicago

Chairman, E. R. Young, Climax Molybdenum Co.
Vice-Chairman, L. L. Henkel, War Production Board
Secretary, N. F. Hindle, American Foundrymen's Assn.

Brass & Bronze

H. M. St. John, Crane Co.
C. K. Faunt, Christensen & Olsen Foundry Co.

Steel

L. H. Hahn, Sivyer Steel Casting Co.
F. S. Sutherland, Continental Roll & Steel Foundry Co., East Chicago, Ind.

Malleable

L. J. Wise, Chicago Malleable Castings Co.
W. D. McMillan, International Harvester Co., McCormick Works.

Cast Iron

L. H. Rudesill, Griffin Wheel Co.
J. H. Gellert, Nichol-Straight Foundry Co.

Aluminum

G. H. Starmann, Apex Smelting Co.

Magnesium

G. H. Curtis, Chrysler Corp., Dodge Chicago Plant.

Cincinnati

Chairman, Stanton T. Olinger, Cincinnati Gas & Electric Co.

Gray Iron

Jos. Schumacker, Cincinnati Milling Machine Co.

Non-Ferrous

Ed. Korten, Reliable Pattern & Foundry Co.

Pattern Making

Charles Appel, The Lunkenheimer Co.

Alloys

Earl Kindinger, Williams & Co., Inc.

Pig Iron

Robt. Ebersole, Miller & Co.

Scrap Iron

L. W. Pryse, Hickman Williams & Co.

Steel

J. B. Caine, Sawbrook Steel Castings Co.

Detroit

Chairman, F. A. Melmoth, Detroit Steel Casting Co.

Steel

Ernest Lancashire, Detroit Steel Casting Co.
R. J. Wilcox, Michigan Steel Casting Co.

Gray Iron

V. A. Crosby, Climax Molybdenum Co.
L. W. Thayer, Cadillac Motor Car Div.

Malleable

C. F. Joseph, Saginaw Malleable Iron Div., Saginaw, Mich.
G. L. Galmish, Michigan Malleable Iron Co.

Aluminum & Magnesium

M. E. Brooks, Dowmetal Foundry, Bay City, Michigan.

Brass & Bronze

J. P. Carritte, Jr., True Alloys, Inc.

Metropolitan

Chairman, J. S. Vanick, International Nickel Co., New York.

Aluminum, Magnesium, Light Metals

R. E. Ward, Bendix Aviation Corp., Bendix, New Jersey.

Steel

K. V. Wheeler, American Steel Castings Co., Newark, N. J.

Brass & Non-Ferrous Foundry

D. E. Broggi, Neptune Meter Co., Long Island City, N. Y.

Brass & Non-Ferrous Castings

S. Frankel, H. Kramer & Co., New York.

Pig Iron

N. Anderson, Debevoise-Anderson Co., New York.

Cupola Practice & Foundry Equipment

H. A. Deane, American Brake Shoe & Foundry Co., Mahwah, N. J.
D. J. Reese, International Nickel Co., New York.

Pressure Castings

R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J.

(Continued on next page)

Chapter gathered at the Cincinnati Club on November 16 for their regular monthly meeting. Chapter Chairman Frank E. Hutchinson, Reliance Foundry Co., Cincinnati, presided, and in a short business session following dinner introduced R. E. Kennedy, National Secretary of A.F.A., visiting from Chicago to outline important A.F.A. activities of interest to the group.

In the two group sessions on technical problems, Edgar O. Stamm, Buckeye Products Co., Cincinnati, presided over the non-ferrous group, at which Wm. Franck, Campbell Hausfeld Co., Harrison, Ohio, was the main speaker on "Melting Non-Ferrous Alloys."

Group leader of the ferrous section was W. J. Buvinger, Buckeye Foundry Co., Cincinnati. Discussion at this session was sparked by the talk of Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., on the "Use of Scrap Iron in the Foundry." Mr. Kuniansky outlined experience in using a high percentage of scrap in cupola melting and answered a number of questions put by members.

Central Indiana Has War Problems Group

By Ralph A. Thompson,*
Indianapolis, Ind.

MEETING at the Washington Hotel, Indianapolis, on December 7 for a regular technical meeting, 115 members and guests of the Central Indiana Chapter learned of the new War Problems Committee formed within the organization. Chapter Chairman B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis, presided and named the personnel of the new group, headed by Harold Lurie, Cummins Engine Co., Columbus, Ind., as chairman. Complete personnel of the War Problems Committee is shown below.

Two interesting speakers from Caterpillar Tractor Co., Peoria, Ill., headlined the meeting: M. J. Gregory, factory manager of the foundry division, and National Director of A.F.A., and Zigmund Madacey, superintendent of the company's core department. Mr. Gregory, speaking on problems of the foundry industry, made several important recommendations on what foundrymen can do today and in the future on behalf of broadening the acceptance of cast metals.

Core blowing was Mr. Madacey's subject, his talk being made more interesting by samples of cores and castings as

*Electric Steel Castings Co., and Secretary of Central Indiana Chapter.

War Problems Committees of A.F.A. Chapters (Cont.)

Gating & Risering Small Castings
W. T. Dette, Robins Conveying Belt Co., Passaic, N. J.

Gating & Risering Heavy Gray Iron Castings
J. W. Reid, R. Hoe & Co., Dunnellen, N. J.
David MacIntosh, Sacks-Barlow Foundries, Inc., Newark, N. J.

Cores, Sand, Refractories
W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.

Government Specifications
N. A. Kahn, U. S. Navy Yard, Brooklyn, New York.

Heat-Resisting Alloy Castings
E. Cook, American Brake Shoe & Foundry Co., Mahwah, N. J.

Michiana

Chairman, R. E. Patterson, Elkhart Fdry. & Machine Co., Elkhart, Ind.
Advisory, Dr. E. G. Mahin, University of Notre Dame, South Bend, Ind.

Magnesium, Aluminum & Brass
A. T. Ruppe, Bendix Products Div., Bendix Aviation Corp., South Bend.

Steel
Herman Hess, Clark Equipment Co., Buchanan, Michigan.

Malleable and Gray Iron
J. E. Drain, Oliver Farm Equipment Co., South Bend.

Northeastern Ohio

Chairman, F. G. Steinebach, The Foundry, Cleveland.

Gray Iron
A. C. Denison, Fulton Foundry & Machine Co., Cleveland.
F. J. Dost, Sterling Foundry Co., Wellington, Ohio.
Wm. J. Feth, Forest City Foundries Co., Cleveland.

Malleable Iron
F. A. Stewart, National Malleable & Steel Castings Co., Cleveland.
J. H. Lansing, Malleable Founders' Society, Cleveland.
J. J. Witenhafer, Lake City Malleable Co., Cleveland.

Steel
Ralph R. West, West Steel Castings Co., Cleveland.
J. Trantin, Jr., Youngstown Alloy Casting Corp., Youngstown, Ohio.
C. W. Briggs, Steel Founders' Society of America, Cleveland.

Brass and Bronze
E. F. Hess, Ohio Injector Co., Wadsworth, Ohio.
G. L. Bierly, Mansfield Brass Foundry, Inc., Mansfield, Ohio.

Aluminum and Magnesium
Fred S. Wellman, Wellman Bronze & Aluminum Co., Cleveland.
H. C. Nicholas, Quality Castings Co., Orrville, Ohio.
H. J. Rowe, Aluminum Co. of America, Cleveland.

Patterns
J. V. Brost, Brost Pattern & Casting Co., Cleveland.
M. E. Kohler, Scientific Cast Products Corp., Cleveland.
J. S. Parker, Motor Patterns Co., Cleveland.

Pig Iron
T. G. Johnston, Republic Steel Corp., Cleveland.
A. D. Smith, Bethlehem Steel Co., Cleveland.
Wm. Ramsey, Pickands, Mather & Co., Cleveland.

Cupola Operation
W. O. Larson, W. O. Larson Foundry Co., Grafton, Ohio.
Wm. C. Manwell, Fulton Foundry & Machine Co., Cleveland.
Milton Tilley, National Malleable & Steel Castings Co., Cleveland.

Core Production
E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland.
Wm. Kayel.

Philadelphia

Chairman, J. H. S. Spencer, H. W. Butterworth & Sons Co., Philadelphia.

Quad City

Chairman, P. T. Bancroft, Republic Coal & Coke Co., Moline, Ill.
A. H. Putnam, A. H. Putnam Co., Rock Island, Ill.
C. F. Burgston, Deere & Co., Moline.
W. E. Jones, Ordnance Steel Foundry, Bettendorf, Iowa.
C. S. Humphrey, C. S. Humphrey Co., Moline.
John Diedrich, Blackhawk Foundry & Machine Co., Davenport, Iowa.

St. Louis

Chairman, C. B. Shanley, Semi-Steel Casting Co., St. Louis, Mo.
L. C. Farquhar, American Steel Foundries, East St. Louis, Ill.
W. E. Illig, Banner Iron Works, St. Louis.
A. O. Nilles, Griffin Wheel Co., North Kansas City, Kans.
F. O'Hare, Central Brass & Aluminum Foundry, St. Louis.
L. J. Desparois, Pickands Mather & Co., St. Louis.
E. A. Goerger, City Pattern & Model Co., St. Louis.
H. Goodwin, Medart Co., St. Louis.
W. L. Kammerer, Midvale Mining & Mfg. Co., St. Louis.
F. B. Riggan, Key Co., E. St. Louis, Ill.
G. W. Mitsch, American Car & Foundry Co., St. Louis.
Jas. Roland, Fry-Fulton Lumber Co., St. Louis.
W. A. Zeis, Midwest Foundry & Supply Co., Edwardsville, Ill.

Western New York

Chairman, Wm. S. Miller, Chas. C. Kawin Co., Buffalo, N. Y.

Gray Iron
Alex Rankin, Lake Erie Engineering Corp., Kenmore, N. Y.
M. W. Pohlman, Pohlman Foundry Co., Inc., Buffalo.

Malleable
J. W. Considine, Jewell Alloy & Malleable Co., Inc., Buffalo.
F. J. Wurscher, Acme Steel & Malleable Iron Works, Buffalo.

Steel
J. P. Begley, Pratt & Letchworth Co., Buffalo.
J. H. Sander, American Radiator & Standard Sanitary Corp., Buffalo.

Non-Ferrous
J. C. McCallum, McCallum-Hatch Bronze Co., Buffalo.
H. R. King, Metal & Alloy Specialties Co., Inc., Buffalo.

well as slides showing the core blowing process in detail. Among the guests attending was R. E. Kennedy, National Secretary of A.F.A., Chicago.

Birmingham Goes Into Machine Tool Castings

By H. B. McLaurine,* Birmingham, Ala.

THE November 20 meeting of Birmingham District Chapter, held at the Tutwiler Hotel, was featured by Herman K. Ewig, Cincinnati Milling Machine Co., Cincinnati, and a director and past Chairman of the Cincinnati Chapter. Approximately 100 members attended, Chapter Chairman E. A. Thomas, Thomas Foundries, Inc., Birmingham, presiding. Program chairman R. A. Donaldson, Woodward Iron Co., Woodward, introduced the speaker.

Mr. Ewig, speaking on "New Developments in Quality, Control and Production of Machine Tool Castings," told how his company's new plant provides for economical and efficient production of castings for machine tool use. With slides, he outlined the processes and practices employed for quality control and production, tracing the manufacture of castings from start to finished product. He also expressed the appreciation of his chapter for valuable assistance given them by L. N. Shannon, Stockham Pipe Fittings Co., Birmingham, and a National Director of A.F.A.

R. L. Ogden, Stockham Pipe Fittings Co. and co-chairman of the membership committee reported several new members acquired.

*Reporter, Birmingham District Chapter of A.F.A.

West Michigan Hears About Pacific Action

WESTERN Michigan Chapter of A.F.A., at its meeting on December 14 at Ferry Hotel, Grand Haven, Mich., was unusually privileged. Charles Jacobson, Ensign on the U. S. Cruiser "Boise," and son of A. E. Jacobson, Grand Haven Brass Co., and director of the chapter, gave a most interesting account of his experiences when the U. S. Navy met and defeated Japanese warships off the Guadacanal Islands in the Solomon group.

While Ensign Jacobson could not give certain information because of censorship, his account was extremely enlightening. Chapter Chairman Cliff Lonnee, in thanking Mr. Jacobson for his talk, expressed to his father the chapter's pleasure that his son was able to spend this Christmas at home.

Over 125 members and guests were present, representing a large number of foundries of the district. The concluding feature of the meeting was the floor show and the awarding of numerous door prizes.

(Photos courtesy H. A. Nelson, Hill & Griffith Co.)

Just a few of the 450 who attended the Birmingham District Chapter's 7th annual picnic September 19 at Pineview Beach. Left to right—Jas. M. Bates, Moore-Handley Hardware Co., Birmingham, co-chairman of entertainment committee; Chapter Chairman E. A. Thomas, Thomas Foundries, Inc., Birmingham; H. A. Nelson, Hill & Griffith Co., Birmingham, Secretary-Treasurer of the chapter.

Alloy Substitution Is Metropolitan Subject

By K. A. De Longe,† New York City

SUBSTITUTION of one metal for another can be successfully made only when the use of the finished part is known, said Sam Tour, Lucius Pitkin, Lucius Pitkin, Inc., New York, in addressing 80 members and guests of the Metropolitan Chapter at the December 7 meeting at Essex House, Newark, N. J. Mr. Tour, speaking on "Substitutions for Critical Foundry Alloys," emphasized that changes should be made by designing engineers who know metals, and not by economists.

Three important factors in substitutions were given as: Difference in physical properties, difference in fabricating properties, and availability of the substitute. In considering a change of metal for a casting, the speaker said, the designer should first contact his source of supply, then the machine shop, and then the plating shop to make sure the substitute will meet requirements. Some 24 properties to be considered in selecting a substitute were listed.

Mr. Tour stressed the responsibility of foundrymen for providing engineering colleges with accurate information on the function and usefulness of cast metals. He mentioned several opportunities for castings substitutions and offered a number of suggestions on substitutes for aluminum base sand castings, brass castings, bronze castings and nickel silver castings. After his talk the meeting broke up into smaller groups for discussion of problems involving the various types of cast metals.

†International Nickel Co., and Secretary, Metropolitan Chapter.

Abstracts

NOTE: The following references to articles dealing with the many phases of the foundry industry, have been prepared by the staff of *American Foundryman*, from current technical and trade publications.

When copies of the complete articles are desired, photostat copies may be obtained from the Engineering Societies Library, 29 W. 39th Street, New York, New York.

Air Raid Precautions

(*See Safety.*)

Aluminum Castings

(*See Non-Ferrous.*)

PERMANENT MOLD. (*See Non-Ferrous.*)

Cast Iron

DESULPHURIZATION. *"Recent Developments in Desulphurizing Cast Iron,"* G. S. Evans, *Steel*, vol. 110, No. 21, May 25, 1942, pp. 82, 84, 88, 111-112, 115. Paper read at annual Birmingham foundry practice conference, February 1942. Rapid metallurgy today makes use of the cupola, bessemer converter and electric furnace. Metal is desulphurized between cupola and converter, and blown metal dephosphorized between converter and electric furnace, about 70 per cent of these elements being removed by ladle treatment. Desulphurizing seems to offer a means of reducing costs at many locations and somewhat increasing production. In view of great need for more and better iron and steel, it should be given a thorough trial. Duplexing and triplexing cupola processes, converter steel castings, U-shaped mixer ladles, and increased use of soda ash in the cupola are among developments in rapid metallurgy. Desulphurizing reagents are described. Most important factors in efficient desulphurizing, except temperature, are given as: Clean metal free of slag or any siliceous impurities, and rapid and intimate contact between the metal and soda slag. Procedure for insuring both clean iron and maximum contact between slag and metal is given.

HIGH TEST. *"Manufacture of High Test Cast Iron Crankshafts,"* E. M. Currie and R. B. Templeton, *Iron Age*, vol. 149, No. 21, May 21, 1942, pp. 42-46. Shortage of steel and difficulty of obtaining forgings has made substitution of cast iron a matter for close study, in which the foundry standpoint should have prime consideration. Failures of cast crankshafts have been largely due to design factors which could not or would not be modified to the foundry's recommendation. High-test cast iron may be used successfully to replace forged steel in crankshaft production, and cast shafts possess several points of superiority: Reduction of unnecessary weight by coreing; saving of material; wear resistance, high fatigue and damping properties combined with rigidity; reduced resonance and smoother running; reduction of machining costs; low cost patterns, permitting economies in experimental designs; speedier production. The foundry technique involved is described, all crankshafts being made in dry sand molds, with great emphasis laid on uniform cooling. Future development of the cast iron crankshaft depends only on ability of the foundry to produce consistently sound castings in the proper type iron, and on the cooperation of the designing engineer and engine manufacturer, the latter in providing better service performance tests than in the past.

SPECIFICATIONS. *"Let's Take a Look at Specifications,"* John W. Bolton, *The Foundry*, vol. 70, No. 4, April 1942, pp. 133, 208-211. Sound specifications can be very helpful in the war, both toward making sure that the material is suitable for the service, and toward expediting its selection, manufacture and approval. During the past 20 years there has been much practical development in quality and uniformity of cast iron, which means little to the designing engineer unless he can prescribe the mechanical qualities needed in various sections. The only practical way for a consumer to assure himself that the iron he purchases is capable of possessing desired mechanical properties in the desired size sections is to prescribe a size of test bar which bears some relationship to the size of sections to be produced. All foundrymen, without exception, should work toward master specifications for cast iron products, specifications that enable intelligent safe selection in the first place, and insurance of definite standards of quality in the second. In order to conserve other metals and melting media, and to promote greatest speed in the war effort, cast iron should be used as extensively as is safe and proper.

Casting

FILM IMPACT PROCESS. *"Film-Impact Process for Casting Metals,"* J. M. Merle, *Steel*, vol. 110, No. 25, June 22, 1942, pp. 82, 84, 102-103. If a stream of molten metal is supercooled before molding, the resulting casting will have a structure and physical properties like a forging instead of usual cast structure, due to rapid removal of all extra heat. Since a mass of molten metal, as in a ladle, cannot be supercooled and then cast, a film forming method was developed for continuous, fast cooling and immediate molding of the supercooled metal. In the process a molten metal stream from a ladle is formed continuously and instantaneously into a thin film of controlled thickness by a moving section such as a disk, metallic belt or circular rim. The molten metal film adheres to the moving section and loses heat rapidly by thermal conductivity. As it loses heat the physical condition of the film changes, and when it becomes supercooled it comes free and is directed continuously and under high velocity to impact into a mold. Using a film-impact casting machine, 75 per cent of heat is abstracted by the machine, 25 per cent by the mold. The process can be used for production of most metal products in sand, metal and continuous molds and for metal dies.

Conservation

(*See Fuel.*)

TIN. (*See Non-Ferrous.*)

Converter Steel

(*See Steel.*)

Copper

SECONDARY. (*See Non-Ferrous.*)

Desulphurizing

CAST IRON. (*See Cast Iron.*)

Film Impact Casting

(*See Casting.*)

Fuel

CONSERVATION. *"Fuel Conservation in Brass and Iron Foundries,"* Frank Hudson and A. E. McRae Smith, *Foundry Trade Journal*, vol. 68, No. 138, Nov. 5, 1942, pp. 209-214. Paper read before London branch, Inst. of British Foundrymen, presents practical means of saving fuel in melting furnaces, ladle heating and mold and core drying work. The problem is discussed as to natural-draft and forced-draft coke-fired crucible furnaces, and oil-fired crucible furnaces in brass foundry melting practice. Importance in cupola melting is emphasized and a number of suggestions given for fuel economy. Building coal or coke fires in ladles for re-heating purposes, and the use of open fires for mold and core drying are described as extremely wasteful practices. Complete, comparative records are recommended for observing amounts of fuel and power used so that waste may be checked and economies effected.

Heat Treating

STEEL. (*See Steel.*)

Ingot Molds

(*See Steel.*)

Meehanite

TESTING. (*See Testing.*)

Microscope

TESTING. (*See Testing.*)

Non-Ferrous

ALUMINUM CASTINGS. *"Precision Aluminum Castings,"* R. Raymond Kay, *Iron Age*, vol. 149, No. 15, April 9, 1942, pp. 50-54. Use of Antioch plaster mold process is described for production of highly stressed aluminum castings to unusually close tolerances. Material used uniformly limits expansion to about 0.001 in. per in. of length, mixes having practically uniform qualities of permeability, tensile strength and compressive strength. Patterns follow general design of sand pat-

terns whenever possible, employing metal patterns, metal match plates and metal cope and drag plates. Shrinkage allowances are the same as for sand. The process is especially adaptable where complicated coring problems exist, where compound curves are required for contact with other smooth surfaces, and where reduction of weight in stressed parts is important. Use of plaster mixes in the past has been restricted because of excessive and variable shrinkage on complete dehydration, low strength after dehydration, and low heat capacity. Treatment described is said to overcome these objections and provide means of controlling all characteristics desired in a mold.

SECONDARY COPPER. *"Secondary Copper in the War Effort," Steel,* vol. 110, No. 25, June 22, 1942, p. 81. From study by E. E. Thum, *Metal Progress,* prepared for W.P.B. Statistics on availability of copper scrap are given. Low lead limits on bearings and bushings for the armed services require much virgin copper, tin and zinc. It is recommended that revised specifications be carefully considered. It is also recommended that all remaining bronze railroad bearings should be made exclusively of secondary metal; that low impurity requirements on thousands of tons of bronze castings for the Government be revised toward minimum use of virgin metals; and that copper alloy steels be made from steel scrap and pig iron high in copper, plus copper shot made from demolition copper too high in iron for non-ferrous foundry use.

TIN BRONZE ALTERNATES. *"Alternate Specifications for Tin Bronze," Steel,* vol. 110, No. 25, June 22, 1942, p. 68. On the basis of saving tin, silicon bronze is an excellent alternate for tin bronze, but it utilizes large amounts of copper, another strategic material. From conservation standpoint, and to obtain equal service qualities, use is recommended of yellow-brass alloys, manganese-bronze alloys, or aluminum-bronze alloys where savings in both tin and copper may be effected. Where high strength, good corrosion resistance and long wear are desirable, aluminum bronze is a good choice. Physical properties of common tin bronzes and alternate materials are tabulated for ready reference.

Permanent Mold Castings

ALUMINUM. *(See Non-Ferrous.)*

Pig Iron

DESULPHURIZATION. *"Desulphurizing Pig Iron," Iron Age,* vol. 149, No. 15, April 9, 1942, pp. 45-48. Changes in raw materials situation have directed increased attention to economic desulphurization of pig iron. Article reviews report of German research in establishing comparative efficiency of various desulphurizing processes. Much care is required in taking samples, since sulphur is rarely uniformly distributed. Observations were made on over 200 tappings with each of 2 blast furnaces, one operating with soda ash, the other with mixture of soda ash and lime. Results are tabulated. Advantages and disadvantages of desulphurization after the mixer are given. Results are given for tests on feasibility of desulphurizing pig iron in rotary furnaces using lime alone, as well as on lime blast tests. Results of tests also are given on reduction of manganese by means of silicon.

Radiography

(See Testing.)

Safety

INCENDIARY BOMB FIRES. *"Fighting Incendiary Bomb Fires," Industrial Heating,* vol. 9, No. 5, March 1942, pp. 582, 584, 586. Discussion by Safety Research Institute on combating fire bombs, basic weapon of air raids to disrupt civilian and industrial life. Maintenance of protective devices is urged, including regular check-ups and 24-hour guard on all fire fighting apparatus. Reference is made to training film of O.C.D. How to fight a magnesium bomb is described, various types of extinguishers described in use. Training of fire fighters in all industrial plants is emphasized as an important phase of plant protection.

PLANT PROTECTION. *"Emergency Plant Protection Plan Developed by Republic Steel Corp.,"* Steel, vol. 110, No. 25, June 22, 1942, p. 33. Outline of plan designed to meet every emergency resulting from air raid bombings, prepared for uniformity in organization and executing among several plants. Plant emergency protection system is divided into 8 main divisions: Electrical maintenance and communications; police and traffic; safety and health; transportation; fire; mechanical maintenance; first aid, and engineering. Detailed instructions are given on sequence in which plant executives are notified in case of emergency. Thousands of men are being thoroughly trained in various phases of emergency protection, thus performing valuable public service as well as providing for adequate plant protection.

Steel

CONVERTER. *"The Converter's Place in War Production,"* A. W. Gregg, *Steel,* vol. 110, No. 19, May 11, 1942, pp. 110, 112, 125-126. Two factors responsible for converter's come-back are the development of (1) a practical means of reducing sulphur content in the cupola metal, and (2) electric-eye apparatus to aid the converter operator in controling the blow more accurately. Introduction of the desulphurizing process for cupola metal removed one of the principal handicaps of the converter, it is stated, resulting in holding sulphur content in finished steel to 0.03 per cent or less. With the use of electric-eye control, the author declares, operators can be trained in a comparatively short period to produce quality converter metal. The general method of converter operation is described. To date, no practical method has been found for reducing phosphorus content in converter metal, so the original charge must not contain over 0.04 per cent phosphorus.

HARDENABILITY. *"Hardenability of Steel,"* A. E. Focke, *Iron Age,* vol. 150, No. 8, August 20, 1942, pp. 37-40. Present shortage of critical materials make it impracticable to use steel with alloy content high enough so that hardenability can be neglected, hence an understanding of the principles and application of quantitative hardenability testing is advisable. It is vital today to use alloys only where they are absolutely necessary, and in combinations that will provide optimum results. Two basic ideas are included in the term "hardenability," one being the maximum hardness to which a steel can be treated, the other, involving the distance below surface to which steel can be treated to a hardness over a fixed minimum. When steel is quenched from the austenitic state at the critical cooling rates that will produce martensite only, the maximum hardness is a function of the carbon content only. With low or medium alloy steels (less than 5 per cent alloy), the amount of alloy does not significantly affect maximum hardness. Concepts involved in measuring hardenability are discussed, the correlation between maximum hardness and carbon content, and cooling rates, are described.

HEAT TREATMENT. *"Mass Effect in the Heat Treatment of Steel,"* by C. M. Schwitter, *Industrial Heating,* vol. 9, No. 5, March 1942, pp. 594, 596, 598. Various methods of measuring mass effect (hardenability tests) of heat treatment of steel are discussed. Methods depend on measuring hardness only, but can be used to permit estimates of tensile properties by inference. Purpose of test is to indicate maximum bar diameter of a given steel which may be quenched in a given medium to develop full hardness. Advantages and disadvantages of the pilot hardness test and Jominy test are given. For all practical purposes, the small forge shop will find the most economical method of determining mass effect the pilot hardness test on a specimen of required dimensions, but for more complete information the Jominy test or its equivalent is indicated.

TITANIUM DEOXIDATION. *"Titanium Deoxidized Steel Shows Good Sulphide Distribution," The Foundry,* vol. 70, No. 4, April 1942, pp. 135-136, 204-205. Results of some tests made to see if ferro carbon-titanium could be substituted for part of the excessive amount of aluminum required to avoid the network sulphides in steel cast in green-sand molds, and what amounts would be effective. Satisfactory sulphide distribution and ductility should probably be obtainable, it is concluded, with average steel foundry melting practice, using either no aluminum and about 3 or 4 lbs. ferro carbon-titanium per ton, or 1 lb. aluminum and about 7 lbs. ferro carbon-titanium per ton. The former does not always insure against pin-hole porosity with green-sand molding practice. The latter saves at least half the high aluminum addition often used in cast steel, while retaining enough to afford protection against pin-hole porosity, and also giving satisfactory physical properties.

TRIPLEX METHOD. *"Steel Castings by the Triplex Method,"* A. W. Gregg, *Iron Age,* vol. 149, No. 19, May 7, 1942, pp. 61-63. Use of the triplex method, which combines the cupola, converter and electric furnace for producing steel with carbon content lower than that obtainable by use of cupola alone, is relatively new, a result of large wartime demands. General outline of the method and resulting product is given. Cupola charge usually consists of steel scrap plus silicon-bearing material. Temperature of converter steel is controlled by percentage of silicon in the cupola metal. Cupola metal is desulphurized in the ladle prior to blowing. The electric furnace operates as a heated distributing unit, composition and temperature being adjusted and alloys added at this stage. Typical physical properties of triplex steel are given as: Tensile strength 80,000-85,000 p.s.i.; yield point 42,000-48,000 p.s.i.; elongation in 2 in., 25-30%; reducation of area, 42.5-52.5%; cold bend, 140-180 degs. Increased production is claimed for the method, also lower investment for new equipment, and shorter time for putting into operation.

Testing

RADIOGRAPHY. *"Radiography as a Foundry Tool,"* Philip McCaffery, *Iron Age,* vol. 149, No. 20, May 14, 1942, pp. 45-48. Little information has been published on

use of radiography in the foundry itself, and the effect of its use on foundry practice. First step in wider use is to convince shop men that a radiograph can be an exact picture of conditions inside a casting. Radiographs should be marked so that defects can be located accurately in the casting. From overall cost standpoint, radium should pay for itself by decreasing the number of castings rejected during machining because of unsoundness. Another way it can effect savings is by showing number of risers and size of risers can be reduced in many cases, so as to obtain the highest yield consistent with sound castings. Usual practice is to explore thoroughly a first or pilot casting, then making advisable changes in design or foundry practice, and radiographing the casting containing the changes. Once a molding and pouring procedure has been established, an occasional sample will suffice for control. Because specifications for gray iron do not include radiographic requirements, few gray iron foundries used radium as a foundry tool; but the subject warrants more study, especially in developing efficient gating and heading practice.

X-RAY. *"The Use of X-Rays in the Foundry,"* W. Montgomery, *Foundry Trade Journal,* vol. 68, No. 1366, Oct. 22, 1942, pp. 159-170. Paper read before Falkirk branch, Inst. of British Foundrymen. Many interesting and practical applications of radiography for examination of ferrous and non-ferrous castings are described. Before x-ray tests can become a useful instrument in castings inspection, foundrymen must establish standard of acceptance or rejection, depending on size, type, amount and position of inclusions, with consideration for ultimate use of the finished casting. Its use in examining mold and core assemblies is discussed, and safety precautions to be observed in x-ray work are described. In conclusion, it is stated that radiography provides a potential sales argument of force, and that added confidence in castings as engineering materials should result from broader use.

Tin Bronze

ALTERNATES. *(See Non-Ferrous.)*

Tin Conservation

(See Non-Ferrous.)

Titanium

STEEL DEOXIDATION. *(See Steel.)*

X-Ray

FOUNDRY USE. *(See Testing.)*

January Chapter Meeting Schedule

January 4

Central Indiana
Washington Hotel, Indianapolis
R. W. KNAUFT
Charles Taylors Sons Co.
"Refractories, Special and Otherwise"

Chicago
Chicago Bar Assn. Restaurant
ROUND-TABLE MEETINGS:
Steel—*Heat Treating and Equipment*
Gray Iron—*Material Substitutions*
Malleable—*Inspection Problems*
Non-Ferrous—*Specifications & Inspections*
Patterns—*Maintenance of Patterns and Pattern Equipment*

Metropolitan
Essex House, Newark, N. J.
LT. J. DOUGLAS GESSFORD, U.S.N.R.
"Full Speed Ahead for Victory"

January 5

Michiana
Hotel La Salle, South Bend, Ind.

Philadelphia
Engineers Club
NON-FERROUS MEETING
"Strategic Alloys and Substitutes"
C. L. WARWICK, Chief, Specifications Branch, W.P.B.
C. S. COLE, Chief, Metals Section of Specifications Branch, W.P.B.

January 8

Toledo
Hillcrest Hotel
"Cast Steel"

January 11

Cincinnati
Cincinnati Club
G. S. EVANS,
Mathiesen Alkali Co.
"Desulphurization & Metal Purification"
ROUND-TABLE MEETINGS:
Gray Iron, Steel, Non-Ferrous

January 13

New England Foundrymen's Assn.
Engineers Club, Boston
Annual Meeting & Election of Officers

January 14

Northeastern Ohio
Cleveland Club, Cleveland
QUIZ PROGRAM
and Open Forum on Foundry Problems

St. Louis District
De Soto Hotel
ED. H. KING
Hill & Griffith Co.
"Choice and Application of Foundry Facings"

January 15

Birmingham
Tutweiler Hotel

Southern California
Los Angeles Elks Club
H. W. DIETERT
Harry W. Dietert Co.
"Casting Defects Due to Sand"

Western New York
Troop I Post, American Legion Club House, 432 Franklin St., Buffalo, N. Y.
Annual Stag Party

Wisconsin
Hotel Schroeder, Milwaukee
GROUP DISCUSSION

January 18

Quad City
Ft. Armstrong Hotel, Rock Island
W. G. REICHERT
American Brake Shoe & Foundry Co.
"Sand Control"

January 18

Twin City
Coffman Union, Univ. of Minnesota
Dr. E. G. MEITER
Employers Mutual Liability Insurance Company of Wisconsin
"Foundry Hazards"

January 22

Eastern Canada and Newfoundland
Mount Royal Hotel, Montreal
A. W. GREGG
Whiting Corporation
"Cast Iron Melting Practices"

January 23

Chesapeake
Engineers Club, Baltimore
Get-Together Party

January 29

Ontario
Royal Connaught Hotel, Hamilton, Ont.
H. W. DIETERT
Harry W. Dietert Co.
"Behavior of Cores and Molding Sands at Elevated Temperatures"

FEBRUARY MEETINGS

February 1

Central Indiana
Washington Hotel, Indianapolis
H. E. BAUGHMAN
Wheeling Steel Corp.
"Coke and By-Products"

Chicago
Chicago Bar Assn. Restaurant
W. E. GEORGE
Campbell, Wyant & Cannon Foundry Co.
"Plant Protection, Safety and Good Housekeeping"

Metropolitan
Essex House, Newark, N. J.
"Magnesium and Aluminum Castings"